The London School of Economics and Political Science

Three Essays in Applied Economics

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Declarat ion

I certify that the thesis I have presented for examination for the PhD degree of the London School of Economics and Political Science is solely my own work other than where I have clearly indicated that it is the work of others (in which case the extent of any work carried out jointly by me and any other person is clearly identified in it).

I declare that my thesis consists of approximately 32,500 words.

Statement of Conjoint Work

I certify that chapters 2 and 3 of this thesis were co-authored. Chapter 2 was co-authored with Thiemo Fetzer and Oliver Pardo, while chapter 3 was co-authored with Alan Manning. I contributed 33% of the work in chapter 2, and 50% of the work in chapter 3.

Abstract

This thesis consists of three chapters that fall under the broad banner of applied microeconomics.

The first chapter analyses the role of the 2008 amendment to the USA Lacey Act in combatting international trade in illegal timber. Comparing US timber imports over time and across countries and products, I show that the US timber imports fell after the introduction of the Lacey Act. I find the fall in timber imports is accompanied by a fall in illegal trade as measured by the difference between importer and exporter reported statistics. Finally, using the case of Indonesia, I provide suggestive evidence in favor of a reduction in deforestation as a result of the policy.

The second chapter analyzes the effect of a year long rolling blackout in Colombia on mothers' short and long run fertility behavior and socioeconomic outcomes. We use an extensive period of power rationing in Colombia throughout 1992 as a natural experiment and exploit exogenous spatial variation in the intensity of power rationing as an instrumental variable. We show that power rationing induced a "mini baby boom" nine months later. In particular, it increased the probability that a mother had a baby by five percent. Women who were exposed to the shock and had an additional child find themselves in worse socio-economic conditions more than a decade later.

The third chapter documents the way in which the types of people who are admired has changed, arguing that the responses to this question tells us something about the way in which society has been evolving - the 65 years of data are probably the longest consistent series on social attitudes. We present robust correlations between admiration and trust, allowing us to provide information on trends in trust on a consistent basis back to the late 1940s, earlier than most other data sources.

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Preface

This thesis is composed of three independent chapters. My family background in the timber industry inspires the first chapter. Having business interests in sawmilling and exports of timber, I have seen several policy attempts in my country aimed at enhancing sustainable timber trade. This chapter tries to highlight the effectiveness of consumer country policies in combatting illegal timber trade, particularly in countries with weak institutions. I study a broad based policy measure, namely the Lacey Act of 1900, or simply the Lacey Act. In 2008, USA amended the Lacey Act, making US firms accountable for importing timber considered illegal according to exporter country laws. I use trade data to shed light on the role of the Lacey Act in reducing the global trade in illegal timber. Being the largest single importer of timber in the world, the USA provides an excellent case study on consumer country enforcement.

First, using different counterfactual exercises, I show that timber imports to the US fell significantly after the introduction of the Lacey Act. Next, motivated from the literature on illicit trade, I use the difference between importer and exporter reported statistics and show a significant and meaningful fall in illegal timber trade post the introduction of the Lacey Act. Furthermore, I show that this relationship is significantly higher in countries with higher levels of corruption. Finally, I present a direct link between the Lacey Act and deforestation. Looking at Indonesia, a country with high level of illegal timber exports, I study the impact of the Lacey Act on deforestation rates within the country. The chapter builds a strong case for the role of consumer countries in combatting the global trade in endangered species, illegal goods and other items of sensitive nature.

The second chapter (joint with Thiemo Fetzer and Oliver Pardo) is motivated from my personal experience of facing many blackouts growing up. Coming from a developing country, blackouts are a common feature, especially during times of droughts as majority of power is hydro driven. This has led to the creation of the urban legend "whether procreation increases when lights go out", capturing the imagination of demographers, sociologists, and social scientists for a long time. This chapter tries to address this urban legend by specifically studying one dimension of the social cost of bad public infrastructure in developing countries. We analyzes the effect of a year long rolling blackout in Colombia on mothers' short and long run fertility behavior and socioeconomic outcomes.

We formalize an intuitive idea that blackouts decrease the opportunity cost of

sex, leading to more children, which in turn increases the opportunity cost of schooling and accumulation of other assets in general. We find statistical evidence in support of a "mini baby boom" nine months later. In particular, it increased the probability that a mother had a baby by five percent. More importantly, not all women are able to adjust their lifetime fertility. We estimate that every tenth baby born due to the power rationing was not adjusted for 12 years later, resulting in an overall increase in total fertility. This increase has indirect social costs for mothers who are not able to adjust their lifetime fertility. They find themselves with worse socioeconomic conditions more than a decade later. Overall, the chapter suggests that energy infrastructure investment has to account for the social returns it gets from reduced fertility.

The third chapter (joint with Alan Manning) is inspired by the human desire to seek for role models. We compile and analyze data from the annual Gallup Opinion Poll, which asks an open-ended question on who do you admire the most? This exercise is interesting for a number of reasons. First, the description of the way in which the responses have changed can tell us something interesting about the way social attitudes have been evolving over 65 years. Arguably this is the longest run of data on social attitudes on a consistent basis that exists. Second, we argue on theoretical grounds and show using empirical analysis that admiration can be linked to trust, and specifically that admiring the president is strongly related to trust in government. Using this link we can provide information on trends in trust on a consistent basis back to the late 1940s, earlier than most other data sources. Third, the chapter investigates the link between admiration and media mentions. We show a robust correlation between number of mentions in newspapers in a particular year and state and the likelihood of being admired, highlighting the link between media, culture and social capital.

Chapter 1

Blocking Illegal Trade: The US Lacey Act

The goal of this chapter is to examine if consumer country enforcement can reduce illegal trade in timber. Illegal trade in timber has serious economic, environmental and social impacts. In addition to loss of government revenue and local economic development, illegal trade can undermine environmentally sustainable activities. In the extreme case, it can undermine the rule of law and lead to resource misallocation, armed conflict in fragile states or be a source of financing civil conflicts (see for example Alemagi and Kozak, 2010; Baker et al., 2004; Goncalves et al., 2012). To put this in perspective, estimates suggest that illegal trade in wildlife and timber amount to 30-70 billion US dollars per year, equivalent to perhaps 10-20% of the value of the illegal trade in narcotics or 15-30% of the value of the trade in counterfeit goods (OECD, 2012). This problem is heightened when source countries have week institutions. In Indonesia, for example, between 60 to 80% of wood yield may involve some illegality (Burgess et al. (2012)).

In recent years consumer countries have tried to exclude illegal (and sometimes unsustainable) timber products from international trade through the use of regulatory measures. In this chapter, I study a broad based policy measure, namely the Lacey Act of 1900, or simply the Lacey Act. The Lacey Act is a conservation law in the United States that prohibits trade in wildlife, fish, and plants that have been illegally taken, possessed, transported or sold. On May 22, 2008, the Lacey Act was amended to include the originally tabled Combat Illegal Logging Act of 2007, by expanding its protection to a broader range of plants and plant products. This makes it a legal prohibition to import illegal timber products into the US and places 'due diligence' requirements on the industry (Duncan Brack and Rob Bailey (2013)). Penalties for violation of the Act are severe and can range from 1-5 years in prison and up to $500,000 in fine. With the adoption of the European Union Timber Regulation (EUTR) and Australian Illegal Logging Prohibition Bill in 2013, many other countries are adopting a similar approach to the US (Brack (2012)).

The Lacey Act has several appealing features making it a relevant case study. First, unlike EUTR, the Lacey Act is enforced by a small but expert federal team,

thus improving enforcement. Second, US is the single largest importer of wood and wood based products, driving the global demand for timber. In 2006 alone, the US imported $3.8 billion worth of wood products (not including pulp and paper), of which 10% were considered to be 'high risk' [1]. Finally, the Lacey Act was implemented in 2008, giving me enough years after its introduction to measure the impact of the policy.

My measure of illegality is motivated from the literature on illicit trade. I take advantage of the difference in legality of shipments between importer and exporter countries to proxy for illegal trade. Once the illegally exported goods leave the country of origin, they are not generally regarded as contraband when imported into the destination, absent additional agreements (Gerstenblith (2004)). Thus, US imports provide a proxy for 'true' level of trade and the difference between importer and exporter trade figures provide a credible measure of illegal exports. Following Fisman and Wei (2009) I construct the measure of illegal trade as the reporting gap defined by the log difference between imports and mirror exports. In absence of illegal behaviour, the illegal trade/ reporting gap should simply be the difference in trade costs between US and the exporter country[2] and not vary systematically before and after the Lacey Act by exporter country attributes.

To isolate the casual effect of the policy on illegal trade in timber, I need exogenous variation in the implementation of the policy. This is unlikely to hold given that the Act was strongly lobbied by various politicians and organizations. Some have argued that the amendment was introduced to protect US lumber jobs from foreign competition (Christianson (2012)). However, the standalone implementation of the Lacey Act by the US in 2008 induces differences in exposure across importer countries and products, thus motivating a difference-in-difference estimator of the treatment effect. The key difficulty for this exercise is to find an adequate control group for which a difference-in-difference methodology can be applied. This is not straightforward as other importer countries and/or products may be differing in many ways, such that it is difficult to verify a common trends assumption. In particular, the identification assumption here requires that no omitted time-varying characteristics are correlated with the timing of the policy. Thus, in addition to including a hoard of fixed effects, I present the exercise using two different control groups to try and address shortcomings associated with each strategy individually. First, I use the European Union 27 (EU)[3] as a valid control for timber trade given that it is the other main wood importer in the world with similar level of institutions as the US. To address concerns regarding the differential impact of the financial crisis on importer countries and potential spill over of the policy via processing countries, I use US imports of works of art (HS Code 97) as an alternative control. The choice of works of art as a control is motivated from Fisman and Wei (2009) who show

[1] See http://eia-global.org/lacey/ accessed 14/03/14)

[2] The exporter country reports FOB values, while the importer country reports CIF values. The difference between the two measures is essentially freight costs and related charges.

[3] I aggregate data across the 27 member states of the European Union.

there is a strong link between corruption and illegal trade in objects of antiquities. Works of art provide for a good control/ placebo since the Lacey Act is irrelevant for consideration of trade in antiquities, yet it is a known commodity fraught by illegalities[4].

In sum, I find that the Lacey Act reduced timber imports between 20% and 50% post 2008 depending on the experiment design. This highlights a significant and real effect of the policy on US trade. Next, I find suggestive evidence for a fall in the reporting gap for timber imports using both the counterfactual exercises. An examination of the non-parametric esitmates confirms large and persistent effects only post 2008. Further, using the differential level of corruption across exporter countries, I test the effectiveness of the policy in reducing the reporting gap for 'high risk' countries. I conclude that the effect of the policy increases with the degree of corruption in the exporter country and that this is driven by better reporting in the exporter country; for an increase in corruption by 1 standard deviation, the bilateral reporting gap between the US and the exporter country falls by 60% post the introduction of the Lacey Act. This suggests consumer country enforcement seems to "bite" where it matters the most.

A potential concern regarding the measure of illegal trade is that data maybe missing from the official statistics for various reasons other than illegal activity. Data maybe missing due to exchange-rate miscalculations, different accounting procedures, or statistical errors. However, one would not expect these to be correlated with the introduction of the Lacey Act. To ensure my measure of illegal trade is robust to such concerns, I re-construct the reporting gap in various ways. In particular, since the reporting gap should be positive for there to be a meaningful interpretation of the measure[5], I re-define the measure by censoring the negative values to zero, I truncate the data by dropping negative values and I also censor the positive values to zero as a placebo check. Finally I also consider the quantity gap[6] in order to address concerns related to trade costs, CIF and FOB reporting. I find my results remain robust across the different specifications.

The second part of the chapter tries to provide evidence on the link between the Lacey Act and deforestation. One major challenge linking any trade activity/ policy and deforestation is that, only a fraction of trees cut enter the export market (Burgess (1993)). One country where forestry has been a significant component of export led growth is Indonesia.

Using regional variation in level of corruption (Transparency International, 2008) and Global Forest Change (GFC) satellite imagery for deforestation data, I present a reduced form relationship between the Lacey Act and deforestation in Indonesia. The GFC allows me to detect deforestation at a 30 meter by 30 meter resolution annually for all of Indonesia from 2001 to 2012 (Hansen et al. (2013)). Motivated

[4]Within HS97, the sub-heading HS 9703 is also subject to the Lacey Act requirements as it may contain significant parts of wood. Excluding it from the analysis does not change my results.

[5]Negative gap may exist due to reporting error or due to timing of recording in the even trade happens at the end of the year.

[6]Quantity gap is measured by the difference in the reported value of weight measured in kilograms.

from the earlier findings, I use the measure of corruption to identify the degree of within country exposure to the Lacey Act. I find that an increase in corruption by 1 standard deviation reduces deforestation by 16,500 hectares post 2008[7]. The findings in this chapter are consistent with recent firm level evidence where Rodrigue and Soumonni (2014) show that Indonesian firms that invest in environmental abatement are likely to observe 1.4% to 6% faster growth in export demand. Put together, trade policies can alter demand for more environmentally conscious goods and thus change the nature of production and products on a global level.

This chapter adds to the growing empirical literature on trade of restricted goods (see for example Fisman and Wei, 2009; Vezina, 2014; Chimeli et al., 2012; Ivanova, 2007) and economics of deforestation (see for example Burgess et al., 2012; Morjaria, 2014), however there are two key departures from prior work. First, earlier studies of trade in restricted goods have focused largely on correlates of illegal trade, while I use rich source of cross country data to provide a better understanding of policies aimed at combating illegal trade, thus adding to the literature on illegal behaviour. Second, I present evidence of a trade policy on reducing deforestation in Indonesia, a country where forestry exports are a key component of the economy. Finally, the chapter also falls under the broad research question of international trade and non-tariff barriers (see for example Brown, 2013, 2006; Staiger, 2012; Michaels and Zhi, 2010)

It is important to note that the chapter only carries out a partial equilibrium exercise. I try to extend the analysis by looking at deforestation and illegal trade in timber, however, there maybe other welfare worsening effects of the policy for parties involved, at least in the short run. In presence of weak institutions, many developing countries may have no better alternative other than to engage in unsustainable/ illegal logging. Doing a general equilibrium analysis is beyond the scope of this chapter, thus the reader is cautioned to keep an open mind when interpreting the results.

The rest of the chapter proceeds as follows. In section 2 I present a simple framework to motivate the analysis to follow. Section 3 provides a brief background on the institutional features of the Lacey Act and the data used in the chapter. Section 4 presents the core results establishing the link between consumer country policies and illegal trade in timber. Section 5 extends the analysis of the Lacey Act linking it to deforestation and section 6 concludes.

1.1 Framework

In order to guide the empirical analysis to follow, I present a stylized framework with a single importer and single exporter with a market for exports of illegal timber. Price of illegal (i) timber is denoted by p_i and is determined in equilibrium. Importers can only be caught at customs, after which all timber becomes legal if

[7] I am not able to use the Lacey Act as an instrument for illegal trade as I do not have a measure of regional level exports from Indonesia.

undetected. Importers are faced with a probability of detection which is assumed to be a function of the level of illegal timber imported ($q(i)$). Thus, the greater the amount of illegal imports, the higher the likelihood of being detected at customs. The importer receives a revenue of i if not discovered, and $i - fq(i)$ if discovered. The price of the timber sold on the retail market is normalized to one. For simplicity, the importer keeps all illegal timber in the event of detection, but must pay a fixed fine f with probability $q(i)$ in the event he/ she is caught. It is important to note that the legal and illegal timber markets could have significant interdependencies in reality, which would complicate the analysis. For example, legal imports maybe used to mask illegal imports, thus the detection technology of customs maybe a function of the share of illegal imports as opposed to the level of illegal imports. I abstain from these interactions in order to highlight the role of corruption on illegal trade. The importer thus solves the following expected profit function:

$$max_i \quad (1 - p_i)i - fq(i), \quad s.t \quad i \geq 0. \tag{1.1}$$

Conversely, the supply of illegal timber comes from the exporter. The exporter has a similar problem to the importer, however his probability of detection not only depends on the amount of his own illegal exports, but also on the corruption level of his country. The probability with which he is detected is a function of $\phi r(i)$, where ϕ is the level of corruption in the exporter country and $r(i)$ is the probability of detection dependent on the level of illegal exports. The cost of extracting timber is assumed to be linear in the amount of illegal timber extracted. The cost per unit extracted is denoted by c. In the event the exporter is detected, he is allowed to export the timber but must pay a fixed fine g. The exporter maximizes the following expected profit function:

$$max_i \quad (p_i - c)i - g\phi r(i), \quad s.t \quad i \geq 0. \tag{1.2}$$

I assume both detection technologies, $q(.)$ and $r(.)$ are convex in illegal wood exports. Thus $\frac{\partial q}{\partial i} \geq 0$ and $\frac{\partial^2 q}{\partial i^2} \geq 0$. Same holds for $r(.)$.

The first order condition for the importer is:

$$1 - p_i - fq_i(i) = 0 \tag{1.3}$$

The first order conditions for the exporter is:

$$p_i - c - g\phi r_i = 0 \tag{1.4}$$

Conditions 1.3 and 1.4 simply state that the marginal revenue of a unit of wood must equal its marginal cost[8]. Solving 1.3 for p_s and substituting the resulting expression in 1.4, we get:

[8]All second order conditions ensure these are local maximums

$$1 - fq_i(i) - c - g\phi r_i = 0 \tag{1.5}$$

The above condition ensures that the risk return payoff is equalized between the importer and exporter through the market price of illegal wood p_i. I treat the introduction of the Lacey Act as an increase in the fine required to be paid by the importer in the event he/she is detected smuggling illegal wood. This is motivated by the fact that the fine for importing illegal wood increased up to $500,000. Our primary interest is to study the impact of the Lacey Act on the equilibrium level of illegal wood traded and if there are heterogeneous effects of the policy based on the exporter country corruption. Below I present the comparative statics. First, consider how demand for illegal wood responds to changes in the level of fine applied by the importer country:

$$\frac{\partial i}{\partial f} = \frac{-q_i}{f + q_{ii} + g\phi r_{ii}} < 0 \tag{1.6}$$

Prediction 1: **The model predicts that the introduction of Lacey Act as measured by the rise in importer country fine should reduce trade in illegal wood**.

Next, let us consider the second partial with respect to corruption ϕ in the exporter country:

$$\frac{\partial^2 i}{\partial f \partial \phi} = -\frac{q_{ii}\frac{\partial i}{\partial \phi} + gr_{ii}\frac{\partial i}{\partial f}}{g\phi r_{ii} + fq + ii} > 0 \tag{1.7}$$

The result is based on the assumption that detection technologies are strictly convex and $\frac{\partial i}{\partial \phi} = \frac{gr_i}{fq_{ii} + g\phi r_{ii}} < 0$. Thus the model predicts that countries with higher degree of corruption (inverse of ϕ) will experience a bigger impact of the Lacey Act then countries with lower level of corruption (i.e. a high ϕ). The intuition for the above finding is subtle. Demand shocks effect the equilibrium quantity of illegal timber traded via two channels, one being the direct impact on the price of illegal timber and the other being through the risk return trade-off from being caught. Imagine that there is an exogenous positive demand shock to the price of illegal timber. In this case, exporters will increase quantity of illegal timber traded, however this also effects their detection technology through $\phi_c r(i)$. Since the effect of a rise in exports of illegal timber increases the detection of less corrupt countries by a bigger amount (due to a higher ϕ_c), they will respond less to a positive demand shock, similarly, they will also respond less to a negative demand shock. Thus, the Lacey Act, which is as a negative demand shock, will have a larger effect for more corrupt countries.

Prediction 2: **The greater is the degree of corruption in the exporter country, the more responsive it will be to the introduction of the Lacey Act. In other words, the Lacey Act is able to target precisely the countries where timber is likely to be of more susceptible nature.**

1.2 Background and Data

1.2.1 Background: Lacey Act

Illegal trade may arise if it is more costly to comply within the law of the country. It may arise even when legal trade may not be more costly, but if demand exceeds supply of legal products. This is often the case for timber as producing countries try to manage their natural forests from over exploitation.[9] It involves any one of the following activities: the harvest, transportation, purchase or sale of timber in violation of laws. The harvesting procedure itself may be illegal, including using corrupt means to gain access to forests; extraction without permission or from a protected area; the cutting of protected species; or the extraction of timber in excess of agreed limits.

The amendment to the Lacey Act extended the ban on trading illegally sourced wood products in 2008. There are two major components to the amendment: a ban on trading plants or plant products harvested in violation of the law; and a requirement to declare the scientific name, value, quantity, and country of harvest origin for some products. The ammendment to the Lacey Act was first floated by Congressman Earl Blumenauer in March of 2007 under the "Legal Timber Protection Act". Senator Wyden introduced a senate version in August of 2007 after garnering support from environmental and industry groups under the "Combat Illegal Logging Act of 2007". At the Time of introduction, the act had 3 cosponsors and backing of 24 organizations. Finally the ammendment was adopted in May 2008 under the Lacey Act. A brief timeline of the evolution of the Lacey Act is presented in appendix 1.B figure 1.B.1

The Lacey Act has a very broad coverage making it extremely difficult for importers to claim negligence as a defence. The Act requires the importer to prove legality of harvest, legality of transactions (i.e. taxes, fees and etc.) and plant protection laws (i.e. CITES, local laws); further, the underlying foreign law violation does not have to be a criminal violation, nor one actively enforced in the foreign country. It need not be committed by the person charged with violating the Lacey Act - a third party might have taken the product illegally; the underlying foreign law can be interpreted by the US courts. More importantly, enforcement is fact based and not document based (which themselves can be subject to corruption).

Penalties for violation of the Act are also steep, acting as a deterrent in conduct of illegal trade. There is complete forfeiture of goods, misdemeanours are punishable by 1 year in prison and a fine of $100,000 ($200,000 for corporations), while felonies are punishable by 5 years in prison and a $250,000 fine ($500,000 for corporations).

Finally the agencies interested in the enforcement of the Act include, but are not limited to: (1) U.S. Fish and Wildlife Service; (2) Animal Plant Health Inspection Service; (3) Immigration and Customs Enforcement; (4) Customs and Border Protec-

[9] On the other hand, illegal trade may exist for completely banned products, which is generally common in wildlife crime.

tion; (5) U.S. Department of Agriculture; (6) Federal Bureau of Investigation; and (7) U.S. Forest Service. In investigating potential violations of the Act, these agencies may receive information from a wide variety of sources, including industry participants, foreign governments and border agents. It is important to note that the Lacey Act provides a "whistle-blower" reward for any person who provides information leading to an arrest or civil penalty under the Act.

Since 2008, the Act has been used in multiple enforcement cases, with the most famous being against Gibson Guitars in 2009 and a current ongoing investigation against US Lumber Liquidators, the largest importers of wooden flooring. Gibson Guitars was found guilty of buying endangered wood from Madagascar and banned wood from India, while US Lumber Liquidators are facing questions concerning illegality within their supply chain for wood harvested from Russian endangered tiger habitat.

1.2.2 Data

1.2.3 Trade Data

The import and export data come from the United Nations' Comtrade database. These data are collected by the United Nations Statistical Division from the trade records of individual countries, and include information on imports and exports for each country, recorded according to the six-digit Harmonized Commodity Description and Coding System (HS). I use data for the years 2003 onward for two reasons; first the quality of reporting has significantly improved in developing countries post 2002 and second, the governance indicators constructed by the World Bank are consistently available post 2001. This results in an unbalanced panel for 2003 to 2012.

Trade in timber of all form (processed or unprocessed) excluding furniture is classified as having HS code 44. Figure 1.B.2 in appendix 1.B shows the schedule of commodities and respective product codes for which the Lacey Act was implemented post 2008[10].

Motivated from Fisman and Wei (2009), the primary outcome variable is given by:

$$TimberGap_{cyi} = log(1 + USImports_{cyi}) - log(1 + ExportstoUSA_{cyi}) \tag{1.8}$$

Where c indexes exporter country, y indexes year, i indexes 4 digit product code, $USImports_{cyi}$ is the imports reported by the United States from exporter c, and $ExportstoUSA_{cyi}$ is the exports reported by exporter c destined for the United States. Replacing missing values with 0, or in my case with a value 1 has often been argued to be arbitrary. However in the case of illegal trade, missing values may occur due to miss-reporting and thus must be treated as 0. For example, in 2009, the Lacey

[10] 5 out of 21 4 digit categories are not included in the Lacey Act. I decide to keep them in the analysis due to potential spill over effects to other timber products. The results are qualitatively similar to excluding them from the analysis

Act was enforced against Gibson Guitar who illegally imported Indian sawn timber, which was miss-reported in India. As per India's export regulation, unfinished wood is classified as sawn timber with thickness greater than 6mm and is banned from being exported. The tariff code for such wood is HS 4407. Finished sawn timber, is classified as wood thinner than 6mm and has a tariff code of HS 4408. In the case of Gibson guitars, the Indian export documents labelled the wood as HS 9209, which refer to arts and accessories of musical instruments [11]. This clear miss-reporting would make it appear as if India never exported any wood to the US, while the US would show a positive value for the wood, which was classified as HS 4407 upon entering the US customs. Thus, missing values are a key component to understand illegal trade and must be treated as 0 or 1 as I define above. In the event miss-reporting is purely random, then the Lacey Act should not have any effect on the trade. It is important to note that my measure of illegal trade is a lower bound as all illegal activity channelled through processing countries (i.e. China in the case of US Lumber Liquidators) will be absent from the data. All other illegal trade measures are constructed in the same manner as above.

1.2.4 Other Data

The measure of corruption is obtained from the World Bank World Governance Indicators database (Kaufmann et al. (2014)). The indicators combine the views of a large number of enterprise, citizen and expert survey respondents in industrial and developing countries. The index ranges from -2.5 to 2.5, with higher values corresponding to better outcomes. To avoid confusion, I use the negative of the values reported, thus a higher value is associated with a worst outcome.

I control for the overall level of economic development by including the gross domestic product (GDP) per capita in 2000 US dollars ($Ln(GDPPCUScy)$), taken from the World Development Indicators database. I add regional fixed effects, defining regions as North America and the Caribbean, Latin America, Europe, Africa, Asia, Oceania, and the Middle East.

Finally I do a small amount of data cleaning. I exclude all exporter by 4 digit HS product pairs which had a negative trade gap for all ten years of the sample. Since the negative of the reporting gap is not very meaningful, I exclude such pairs where there is a bias in reporting through out the sample. The final sample used in the policy analysis is an unbalanced panel of exporter-year-product observations. I present summary statistics in table 1.1.

In appendix 1.B, figure 1.B.3, I present the mean relationship between $Corruption_{cy}$ and US $TimberGap_{cyi}$ for the period covering the entire sample, 2003-2012. There is a non-linear relationship with the gap increasing rapidly as the level of corruption increases (the overall correlation coefficient $\rho = 0.36$). A large number of exporting countries where we worry about corruption happen to be in Africa and Asia. Fig-

[11] http://www.heritage.org/research/reports/2012/05/the-lacey-act-from-conservation-to-criminalization, last accessed on 17/08/2014

ure 1.B.4 present the same plot but for different regions. There is a clear positive relationship (with a correlation coefficient ρ = 0.50 and 0.33 respectively). The correlation between corruption and illegal trade is weaker for Latin America and Europe (with a correlation coefficient ρ = 0.15 and 0.07 respectively.).

1.3 Lacey Act

1.3.1 Impact on Timber Trade

Before turning to the impact of the Lacey Act on illegal trade, I first present evidence on the impact of the Lacy Act on US imports. Since the Act deters illegal imports of timber products, we would expect there to be a negative shock to the imports of timber. First, I use the EU as a valid control for US timber trade, given that it has similar levels of institutions and is the other large consumer of timber. For this section, I restrict my analysis to data as reported by the importer country. I specifically consider the fixed effects regression:

$$Ln(Imports)_{dcyi} = \alpha_c + \gamma_i + \delta_y + \beta_1 I_{year \geq 2008} + \beta_2 US_d + \beta_3 I_{year \geq 2008} * US_d + X'_{cy}\Sigma + \epsilon_{dcyi} \tag{1.9}$$

where $Ln(Imports)_{dcyi}$ is the natural logarithm of imports for importer (d) and exporter (c) pair in year (y) for HS 4 digit product (i). α_c, γ_i and δ_y are exporter country, product and year fixed effects respectively, $I_{year \geq 2008}$ is an indicator value equal to one for years greater or equal to 2008, and X_{cy} is a vector of time varying controls for exporter country (c) in year (y). Note that δ_y is perfectly collinear with the indicator dummy $I_{year \geq 2008}$, thus the estimating equation becomes:

$$Ln(Imports)_{dcyi} = \alpha_c + \gamma_i + \delta_y + \beta_2 US_d + \beta_3 I_{year \geq 2008} * US_d + X'_{cy}\Sigma + \epsilon_{dcyi} \tag{1.10}$$

The coefficient of interest is β_3, which measures the average difference in the imports over time between the US and EU. Under the assumption that, after controlling for exporter, product, year fixed effects and exogenous covariates, changes in the bilateral trade experienced by EU provide a reasonable counterfactual for US bilateral trade.

Table 1.2 presents the results, comparing the impact of the Lacey Act on US relative to the EU. The baseline regression is presented in column 1, while in columns (2)-(9) I successively introduce controls. The difference in difference estimator remains significant and large even after controlling for various demanding fixed effects. The results indicate that US experienced a fall in imports after the introduction of the Lacey Act when compared to the EU.

Second, based on existing literature, I use US trade in works of art (HS Code 97) as an alternative counterfactual. Fisman and Wei (2009) show a high incidence

of illegality in exports of banned antiques, which forms a part of the aggregate commodity works of art. Though works of art tend to have high levels of illegal trade, we would not expect the Lacey Act to have any effect on its trade. I consider the fixed effects regression:

$$Ln(Imports)_{cyi} = \alpha_c + \gamma_i + \delta_y + \beta_1 I_{year \geq 2008} + \beta_2 Timber_i + \beta_3 I_{year \geq 2008} * Timber_i + X'_{cy}\Sigma + \epsilon_{cyi} \tag{1.11}$$

where $Ln(Imports)_{cyi}$ is the natural logarithm of imports for exporter (c) in year (y) for HS 4 digit product (i). α_c, γ_i and δ_y are exporter country, product and year fixed effects respectively, $I_{year \geq 2008}$ is an indicator value equal to one for years greater or equal to 2008, and X_{cy} is a vector of time varying controls for exporter country (c) in year (y). Note that δ_y and γ_i are perfectly collinear with the indicator dummy $I_{year \geq 2008}$ and $Timber_i$, thus the estimating equation becomes:

$$Ln(Imports)_{cyi} = \alpha_c + \gamma_i + \delta_y + \beta_3 I_{year \geq 2008} * Timber_i + X'_{cy}\Sigma + \epsilon_{cyi} \tag{1.12}$$

The coefficient of interest is β_3, which measures the average difference in the imports over time between the timber and works of art. Table 1.3 presents the results, comparing the impact of the Lacey Act on Timber imports relative to imports of works of art. The baseline regression is presented in column 1, while in columns (2)-(6) I successively introduce controls. Once again, the difference in difference estimator remains significant and large through out. The results across the two models indicate that US timber imports fell between 20% and 50% after the introduction of the Lacey Act, depending on the counterfactual exercise used. This implies significant and real effects of the policy on US imports of timber.

Using my preferred specifications from table1.2 and 1.3 I estimate weighted regressions using 2 digit trade shares for exporter country in 2003. The coefficients remain robust, indicating that trade with small countries is not driving my findings. Finally, I estimate the model non-parametrically to test for the parallel trends assumption using both the value of imports and quantity of imports as my dependent variable. We would expect no impact of the policy on years prior to 2008, while we expect the effect of the treatment to be positive for years post 2008. Table 1.4 provides evidence in support of this observation. In column (1) to (4), I present the exercise for EU as my control, while in columns (5) to (7), I replace the control group with imports of works of art. In both the models, the omitted year dummy is 2003. The coefficients on the interaction of year dummies and treatment are negative and significant for years post 2007 under both counterfactual exercises. For years prior to 2007, the coefficients are smaller and no longer significant. The fall in the coefficients begin in 2007, the year when the legislation was first proposed in the US Senate[12] ("Combatting Illegal Logging Act" lac (2007)). The timing of the effect

[12]I am unable to perform meaningful impact of the policy on the quantity of imports as there are a

makes it difficult to dis-entangle the impact of the policy from the slowing down of the housing starts in the US, never the less the effect remains persistent well after the economic upturn, confirming the effect of the policy on imports of timber[13]

1.3.2 Lacey Act and Illegal Trade

In this section, I test the prediction of my simple model on the impact of the Lacey Act on illegal trade. In order to test the hypothesis, that the Lacey Act has been effective in reducing illegal trade in timber, I start with equation 1.10 and 1.12, replacing the dependent variable with the constructed measure of illegal trade. The results are presented in table 1.5 and table 1.6. The experiment of interest, the interaction between the Lacey Act ($I_{year \geq 2008}$) and the treatment dummy is significant and large in magnitude regardless of the control group used. The results provide suggestive evidence that timber trade experienced a fall in the reporting gap after the introduction of the Lacey Act. The effect ranges between 75% and 90% based on the counterfactual exercise applied. This implies, the Lacey Act is responsible for eliminating almost all of the US timber trade gap.

Table 1.7 provides some robustness checks for the prefered specification across both the control groups. Weighting the regression by 2 digit trade shares for exporter country in 2003 reduces the size of the coefficient and increases the standard errors, hinting that trade with smaller nations maybe driving the results [14]. Next, I test for whether the results are being driven by the fall in the positive gap or by a fall in the negative gap, by censoring the negative values to zero and the positive values to zero respectively. There are some puzzling aspects to the results. The driving force behind the fall in reporting gap should be a decrease in the positive side of the reporting gap for it to have a meaningful interpretation. This is indeed true for both control groups, however, I also find the negative of the reporting gap decreasing after the introduction of the Lacey Act. One potential reason for this can be that the trade in the 4th quarter of a year is recorded at different points in time by the importer and exporter country. For instance, exports may appear in the current year, while imports may appear the following year due to transit times. This, could potentially affect the negative gap to increase if exporter country reporting improves post the Lacey Act. However, the significant relationship between the positive of the reporting gap and the Lacey Act provides suggestive evidence in favor of there being a meaningful treatment effect. Finally, I present the non-parametric estimates of the preferred specification. The omitted year dummy is 2007, the year before the introduction of the Lacey Act. The fall in the reporting gap only starts post 2008, consistent with the introduction of the policy.

Having established evidence of the policy on timber imports and the reporting

substantial number of observations in works of art with missing data.

[13] I present the same exercise for both the EU and works of art aggregated at the HS 2 digit product code. The results are presented in appendix 1.A table 1.A.2 and 1.A.1. The findings are robust and consistent with the dis-aggregated data.

[14] Indeed countries like Canada make up bulk of the share of US timber trade.

gap, I test the second prediction of the model, is the effect of the policy bigger for more corrupt countries? To explore the relationship between corruption and the Lacey Act further, I take a look at the US timber trade data more closely in the next section.

1.3.3 Lacey Act, Corruption and Illegal Trade

In this section I study the heterogeneous impact of the Lacey Act on illegal trade. I estimate a difference-in-difference estimator motivated by the theoretical model developed earlier (with degree of corruption in the exporter country as a proxy for intensity of treatment). As per the theoretical prediction, exporter countries with a higher degree of corruption should see the biggest impact of better consumer country enforcement. Since corrupt countries are most likely to be exporting illegal timber[15], either due to illegal exploitation of forests and/or due to non-compliance with domestic laws, we would expect the Lacey Act to be more binding for more corrupt countries. The baseline specification is as follows:

$$TimberGap_{cyi} = \alpha_c + \gamma_i + \delta_y + \beta_2 Corruption_{cy} + \beta_3 I_{year \geq 2008} * Corruption_{cy} + X'_{cy}\Sigma + \epsilon_{cyi} \tag{1.13}$$

Now the variable of interest is the interaction between $I_{year \geq 2008}$ and $Corruption_{cy}$, with β_3 being the difference in difference estimator, with corruption beign a measure of continuous treatment. Table 1.8 presents the main results, I sequentially introduce controls as we move across the columns. I find that the Lacey Act is able to reduce illegal trade between 56% and 63% for an increase in corruption by 1 standard deviation post 2008.

In table 1.9, I present a hoard of robustness checks. Column (1) presents the preferred specification from table 1.8. In column (2), I weight the regression by 2 digit exporter country trade shares in 2003. The coefficient on the interaction term is marginally insignificant, but the estimate maintains it stability. In column (3) I consider the quantity gap, the coefficient remains significant and very stable in magnitude. In columns (4) to (7) I test for whether the results are being driven by the fall in the positive gap or by a fall in the negative gap. Column (4) looks at absolute values of the gap, while column (5) truncates the data by dropping all negative gap values, and column (6) censors the negative values to zero. All three columns yield similar and significant results. In column (7), I censor the positive values to zero and as expected there is no effect of the Lacey Act on the negative gap. In columns (8) and (9) I divide the sample into Africa and Asia and the rest of the World respectively. Consistent with the visual inspection of the correlation between corruption and illegal trade, all of the effect is being driven by Africa and Asia, while

[15] In appendix 1.A table 1.A.3, I replicate table 2 from Fisman and Wei (2009) for the correlation between the reporting gap timber (HS Code 44)/ works of art (HS Code 97) and corruption. The results highlight that the reporting gap and exporter country corruption are correlated when there are exporter incentives for miss-reporting regardless of the product type.

the sub sample consisting of the rest of the World has a smaller and insignificant coefficient on the interaction term. In columns (10) I present a placebo test replacing the dependent variable with the reporting gap for works of art. Since the Lacey Act did not affect other product categories, the differences in trade statistics should be pure noise with respect to the interaction between $corruption$ and $I_{year \geq 2008}$. Indeed, the coefficient on the difference in difference estimator is smaller and statistically insignificant.

Next, I estimate the model non-parametrically. I run the following regression:

$$TimberGap_{cyi} = \alpha_{ci} + \gamma_{iy} + \delta_{ry} + \beta_2 Corruption_{cy} + \sum_{l=2004}^{2012} \beta_{1l} D_l * Corruption_{cy} + X'_{cy}\Sigma + \epsilon_{cyi} \tag{1.14}$$

D_l refers to the year dummies and the omitted dummy category is for $l = 2003$. Thus, the coefficient β_{1l} provides estimates for the impact of the Lacey Act for each year compared to the omitted category or control year (i.e. $l = 2003$). Column (12) provides evidence in support of the treatment taking effect post 2008. There is a pre-treatment effect in 2006, however it is only marginally significant and that too half in magnitude relative to the size of the impact post 2008.

In this section, I have provided evidence in support of a heterogeneous effect of the Lacey Act, and in particular one consistent with targeting countries deemed 'high risk'. Next, I try to understand some of the mechanisms behind the fall in the reporting gap and their impact on the exporter country.

1.3.4 Importer vs Exporter Reporting

The fall in illegal trade observed maybe due to a decline in recorded imports or an increase in recorded exports. Evidence from section 1.3.1, indeed shows that imports fell post 2008. One concern regarding the Lacey Act is that in the short run the fall in illegal trade may not be replaced by legal trade, thus negatively effecting the exporter country. To see if the impact of the Lacey Act is being driven by a fall in illegal imports or a shift from illegal to legal exports, I replicate the difference in difference estimator for $TimberImports_{cyi}$ and $TimberExports_{cyi}$, where the two variables are natural log of imports as reported by the US and natural log of exports as reported by the exporter country. Panel A and B of table 1.10 present the results for $TimberImports_{cyi}$ and $TimberExports_{cyi}$ respectively. The Lacey Act has no significant effect on imports, however there is a positive and significant impact of the Lacey Act on the reporting of exports, implying that reporting has improved more in more corrupt places post 2008. This provides evidence in support of a positive impact of substitution from illegal to legal trade. For an increase in corruption by 1 standard deviation, the Lacey act increases exporter reported trade by 62%.

1.3.5 Composition of USA Trading Partners

In addition to having an effect on illegal trade, the Lacey Act may have also changed the composition of US trading partners. Using the data as reported by US customs, I look at the impact of the Lacey Act on the share of country c exports to the USA. To do this, I construct the variable $importsh_{cyi}$ simply defined as the share of imports from exporter c for product i in the total US imports for product i in year y. Since the aim of the Lacey Act is to reduce the trade in illegally sourced timber, one may expect there to be a shift away from imports of timber from more corrupt countries. I use the same difference in difference specification thus far to identify the impact of the Lacey Act on the composition of US imports. I do not find any evidence of the Lacey Act on the composition of import shares. Regression results for the exercise are presented in appendix 1.A table 1.A.4. In the next section, I turn to the analysis of linking the Lacey Act to deforestation in the tropics.

1.4 Deforestation

Having established a relationship between the Lacey Act and illegal trade in timber, I present an exercise on the impact of such policies on deforestation. Even though a reduction in tax evasion, better allocation of timber rights and other illegal activities may have declined post the Lacey Act, it does not necessarily imply deforestation would have decreased. Though the former is very important for efficient functioning of governments, one real effect we care about is the rate of deforestation in some of the reaming tropics. In this section, I study the impact of the Lacey Act on deforestation within Indonesia.

Indonesia in many ways is an ideal context for studying the impact of trade policies on deforestation. First, it contains one of the three largest stands of tropical forest in the world[16] with annual deforestation of 1.17 million hectares of forested area per year [17]. Second, rapid deforestation places it just behind USA and China as the third largest producer of greenhouse gases worldwide (Burgess et al. (2012)). Third, the unique feature of the Suharto government and its emphasis on export-led development meant that Indonesia is the largest exporter of tropical timber in the world, with exports valued at more than $5 billion per year [18]. Finally, a large number of Indonesian timber exports are destined directly to the USA (Duery and Vlosky (2006)) [19].

1.4.1 Deforestation Data

In order to study the impact of the USA trade policy on deforestation in Indonesia, I use regional level data on forest loss before and after the introduction of the

[16]The other two being the Amazon and the Congo basins.

[17]http://risk.forestlegality.org/countries/638/status, accessed on 1st July 2014

[18]http://risk.forestlegality.org/countries/638/status, accessed on 1st July 2014

[19]The average USA imports from Indonesia was $367 million per year between 2003 and 2012, authors calculations.

Lacey Act in 2008. The deforestation measure is constructed using the Global Forest Change 2001-2012 data published by University of Maryland which has been used by geographers and economists to map deforestation (See Hansen et al. (2013)). The dataset constitutes a set of satellite derived images of the world's deforested pixels from 2001 to 2012 with a spatial resolution of approximately 30x30 meters per pixel at the equator. The data has the advantage of being available, where reliable country level forestry statistics do not exist. Other recent applications have been in the sphere of political economy, linking political patronage to land rights and deforestation (see Morjaria (2014)). However, to the best of my knowledge, the deforestation data has not been exploited to study the direct link between trade policies and deforestation. The final measure of deforestation is simply the number of pixels deforested in a specified geographic area over a period time.

For my identification strategy, I construct a regional measure of corruption using the Indonesia Corruption Perception and Bribery Index (CPI) 2008. The survey was carried out by Transparency International Indonesia between September and November 2008 with a total sample of 3841 respondents in 50 cities in Indonesia. I construct a measure of regional corruption using the average CPI score across the sampled cities and normalize it for ease of interpretation. Higher values are associated with worst quality of governance. I obtain additional controls from Badan Pusat Statistik (statistics Indonesia), namely the number of forest concessions by regions and the natural logarithm of regional real GDP in billions of Rupiahs. Using the variation in the measure of corruption across regions in Indonesia, I apply a difference in difference strategy to compare the impact of the Lacey Act across regions and over time. The summary statistics of the data used for the analysis is presented in table 1.11. In my preferred sample with no missing data, I remain with a balanced panel of 22 regions from 2004-2012, giving me 192 observations.

1.4.2 Empirical Results

The model predictions would suggest that the Lacey Act is most binding for more corrupt regions, thus we would expect there to be a fall in deforestation, the higher is the level of regional corruption. I estimate the following fixed effects regression:

$$Deforest_{ry} = \alpha_r + \gamma_y + \beta_1 Lacey_y * Corruption_r + X'_{ry}\Sigma + \epsilon_{ry} \tag{1.15}$$

Where $Deforest_{ry}$ is the number of pixels deforested in region r and in year y. α_r are region fixed effects, γ_t are year fixed effects, β_1 is the coefficient of interest, providing the difference in difference estimator and X is a vector of time varying regional controls. I do not include the Lacey Act indicator and regional level of corruption in the model as they are perfectly collinear with year and region fixed effects respectively. The results are presented in table 1.12. The coefficient on the interaction of the $LaceyAct$ and $Corruption$ is marginally insignificant at the 10%significance level in my baseline specificaton. The coefficient on $Ln(RealGDP)$ is negative and significant, implying that richer regions have lower deforestation. Once I

add the number of forest concessions awarded over time to different regions (column (3)), the difference in difference estimator becomes significant[20]. An increase in corruption by one standard deviation decreases deforestation by 184,000 pixels post 2008. This is approximately equal to an area of 16,500 hectares. However, adding the forest concession data leads to a loss of 11 regions where forest concession information is missing. A further look at the data reveals that these regions have on average very little deforestation. The average number of pixels deforested in the regions with no concession data is 60 per year, while it is 600 in regions with information on concessions granted. Thus, it is likely that these regions are not densely forested and hence irrelevant. This is indeed true when you consider that the missing data is for regions like Bali, Yogyakarta and Jawa to name a few. As expected, the greater the number of concessions granted, the higher is the amount of deforestation. One concern with adding the number of concessions granted as a control is that it might be driving my results, especially since concessions themselves are endogenous to policy changes. In column (4) I restrict my sample to regions where concession data is not missing and exclude the number of concessions granted from the specification. The coefficient on the interaction term remains stable and significant. I take this as suggestive evidence in favour of better compliance from the forestry sector as opposed to better enforcement by the government. Since my left hand side variable is a count measure with a high variance, in columns (5) and (6) I present semi-logarithmic and Poisson models respectively. Both models yield qualitatively similar results, however I lose some precision. Finally in column (7) I use my preferred specification from column (3) to estimate the model non-parametrically. I estimate the following regression:

$$Deforest_{ry} = \alpha_r + \gamma_y + \sum_{l=2005}^{2012} \beta_{1l} D_l * Corruption_r + X'_{ry}\Sigma + \epsilon_{rt} \tag{1.16}$$

where D_l refers to the year dummy. The omitted dummy category is for $l = 2004$. Thus, the coefficient β_{1l} provides estimates for the impact of the Lacey Act for each year compared to the omitted category or control year (i.e. $l = 2004$). Again, we would expect no impact of the Act on years prior to 2008. Similarly we expect the effect to be negative for years post 2008. I find that the effect of the policy is significant only for years post 2008 and it gets bigger in size over time, but is also less precise. Overall, the evidence suggests that the Lacey Act may have played a role in slowing deforestation in Indonesia.

1.5 Conclusion

This chapter set out to analyze the impact of the US consumer country policy on tackling illegal trade in timber. This is the first study to evaluate the impact of

[20]Since I have a small number of clusters, I also apply the Cameron, Gelbach, and Miller (2008) correction for statistical inference with fewer than 30 clusters. My results remain robust to this correction with the interaction term remaining statistically significant at the 10% level.

trade policies on illegal trade, adding to the growing literature on measuring illicit activities. Due to the nature of the topic, data in the field is often difficult to obtain, thus making such studies difficult if not impossible. I highlight that trade statistics, which have been used in the past to evaluate illegal activity can be meaningfully used to study the impact of trade policies on illegal activity. I use this measure to show that the US Lacey Act had a real impact on US imports of timber relative to other countries (namely EU) and to imports of another commodity, which has a significant component of illegality (works of art). This was accompanied by a fall in the illegal activity as proxied by the reporting gap. Further, I show that the policy had the largest impact on countries with the weakest institutions. Finally, using Indonesia as a case study, I present suggestive evidence to support a fall in deforestation post the introduction of the Lacey Act.

Though, it is commonly believed that the longrun benefits of eliminating illegal timber from the supply chain out weight the costs, the short-term implications need not. Given the partial equilibrium nature of the exercise, it is difficult to comment on the welfare implications of the policy both for the importer and exporter country. Since I show a significant fall in imports, even if it is entirely a fall in illegal trade, at the extreme scenario, this maybe welfare worsening if the exporter country has no alternative means of income. One of the success stories of the manufacturing sector in Asia has been the timber industry in Indonesia, however it was also rampant with corruption and illegality during its growth period. Thus one needs to fully weight the cost and benefits of the policy against its long-term objectives. Keeping that in mind, the results in this chapter provide important insights for policy makers on the role of consumer countries in combating the global trade in endangered species, illegal goods and other items of sensitive nature. Often, exporter countries have week institutions, creating a difficult environment for enforcement. In this light, the chapter emphasizes a stronger role for consumer countries in fighting trade in illegal goods.

Table 1.1: Illegal Trade Summary Statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Panel A - Full Sample					
Corruption	-0.26	1.07	-2.550	1.9	17,426
Trade Gap	1.76	6.68	-17.124	19.4	17,426
Ln(GDPPCUS)	8.64	1.51	4.890	11.4	17,009
Imports in millions of USD	13.51	151.0	0.002	7301	14,365
Exports in millions of USD	11.27	152.5	0.000	7303	12,804
Ln(1+Imports)	8.27	5.73	0.000	22.7	17,426
Ln(1+Exports)	10.02	5.26	0.000	22.7	17,426
Panel B - Timber (HS code 44)					
Corruption	-0.31	1.07	-2.550	1.8	11,821
Trade Gap	0.38	6.35	-16.890	19.4	11,821
Ln(GDPPCUS)	8.72	1.47	4.890	11.4	11,588
Imports in millions of USD	15.77	180.9	0.002	7301	9,241
Exports in millions of USD	13.31	175.1	0.000	7303	9,638
Ln(1+Imports)	9.20	5.32	0.000	22.7	11,821
Ln(1+Exports)	9.58	5.62	0.000	22.7	11,821
Panel C - Works of Art (HS code 97)					
Corruption	-0.16	1.05	-2.550	1.9	5,605
Trade Gap	4.66	6.44	-17.124	17.6	5,605
Ln(GDPPCUS)	8.46	1.59	4.890	11.4	5,421
Imports in millions of USD	9.43	71.4	0.002	2146	5,124
Exports in millions of USD	5.08	26	0.000	460	3,166
Ln(1+Imports)	6.31	6.06	0.000	19.9	5,605
Ln(1+Exports)	10.97	4.26	0.000	21.5	5,605

Note: This table reports the summary statistics for the variables used in the empirical analysis. Trade data is measured in nominal US$. Imports and exports are in millions of nominal US$. Import are reported as CIF values and exports are reported as FOB values. The unit of observation is a importer by exporter by product by year quadruple measured in nominal USD Corruption is a normalized index with higher values indicating worst quality of governance. GDP per capita (GDPPCUS) is measured in constant 2005 US$. Panel A contains data for the full sample. Panel B and C present summary statistics for Timber (HS Code 44) and Works of Arts (HS Code 97) respectively.
Source: UNCOMTRADE, WB World Development Indicators and WB World Governance Indicators.

Table 1.2: The Lacey Act and US Imports of Timber vs EU Imports of Timber

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
US X $I_{year \geq 2008}$	-0.200***	-0.198***	-0.195***	-0.201***	-0.273***	-0.314***	-0.257***	-0.272***
	(0.066)	(0.066)	(0.066)	(0.065)	(0.074)	(0.068)	(0.068)	(0.072)
Ln(GDPPCUS)		0.361	0.348	0.356	0.352	0.291	0.389	
		(0.256)	(0.252)	(0.252)	(0.272)	(0.263)	(0.295)	
Corruption			-0.179	-0.164	-0.218*	-0.187	-0.194	
			(0.117)	(0.116)	(0.127)	(0.123)	(0.129)	
Product FE	Yes	Yes	Yes	.	.	.	.	.
Region Year FE	Yes	Yes	Yes	Yes	Yes	Yes	.	.
Importer X Exporter FE	Yes	Yes	Yes	Yes	Yes	.	.	.
Importer X Product FE	No	No	No	Yes	Yes	.	.	.
ExporterX Product Fe	No	No	No	No	Yes	.	.	.
Importer X Exporter X Product FE	No	No	No	No	No	Yes	Yes	Yes
Product X Year FE	No	No	No	No	No	No	Yes	Yes
Exporter X Year FE	No	No	No	No	No	No	No	Yes
Mean of Dependent Variable	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7
Observations	19043	19043	19043	19043	19043	19043	19043	19043

Note: This table reports the effect of the Lacey Act on US imports relative to the EU. The panel is made of importer region (US and EU) by 158 exporter countries and 21 HS 4 digit product codes for timber, over the period 2003-2012. The dependent variable is the ln(imports) as reported by the importer region. US is an indicator equal to 1 if importer is the US and 0 if importer is the EU. For description of variables, please refer to table 1.1. Regions are defined as North America and the Caribbean, Latin America, Europe, Africa, Asia, Oceania, and the Middle East. Robust standard errors in parentheses are clustered by exporter country.

Table 1.3: The Lacey Act and US Imports of Timber vs Works of Art

	(1)	(2)	(3)	(4)	(5)	(6)
Timber X $I_{year \geq 2008}$	-0.514***	-0.509***	-0.507***	-0.507***	-0.572***	-0.605***
	(0.066)	(0.065)	(0.065)	(0.065)	(0.063)	(0.069)
Ln(GDPPCUS)			0.194	0.186	-0.032	
			(0.268)	(0.270)	(0.303)	
Corruption				-0.061	-0.144	
				(0.111)	(0.107)	
Year FE	Yes	.	.	.	.	.
Exporter FE	Yes	Yes	Yes	Yes	.	.
Product FE	Yes	Yes	Yes	Yes	.	.
Region X Year FE	No	Yes	Yes	Yes	Yes	.
Exporter X Product Fe	No	No	No	No	Yes	Yes
Exporter X Year FE	No	No	No	No	No	Yes
Mean of Dependent Variable	12.2	12.2	12.2	12.2	12.2	12.2
Observations	14025	14025	14025	14025	14025	14025

Note: This table reports the effect of the Lacey Act on US imports of Timber relative to the US imports of works of art. The panel is made of 183 exporter countries and 21 and 7 HS 4 digit product codes for timber and works of art respectively, over the period 2003-2012. The dependent variable is the ln(imports) as reported by the importer region. Timber is an indicator equal to 1 if HS Code is 44 and 0 if HS Code is 97. For description of variables, please refer to table 1.1. Regions are defined as North America and the Caribbean, Latin America, Europe, Africa, Asia, Oceania, and the Middle East. Robust standard errors in parentheses are clustered by exporter country.

Table 1.4: The Timing of the Lacey Act and US Timber Imports

	Control: EU27				Control: Works of Art - HS code 97		
	(1) Baseline	(2) Weighted	(3) Ln(Imports in USD)	(4) Ln(Imports in kg)	(5) Baseline	(6) Weighted	(7) Ln(Imports in USD)
Treatment X $I_{year \geq 2008}$	-0.195***	-0.534***			-0.507***	-0.728***	
	(0.066)	(0.062)			-0.065	-0.186	
Ln(GDPPCUS)	0.348	1.289***	0.345	0.176	0.186	0.807***	0.178
	(0.252)	(0.316)	(0.25)	(0.35)	(0.27)	(0.242)	(0.271)
Corruption	-0.179	0.105	-0.178	-0.087	-0.061	0.114	-0.061
	(0.117)	(0.224)	(0.114)	(0.141)	(0.111)	(0.186)	(0.11)
Treatment X 2004			-0.033	-0.072			-0.063
			(0.079)	(0.115)			(0.095)
Treatment X 2005			-0.113	-0.181			0.006
			(0.103)	(0.131)			(0.107)
Treatment X 2006			-0.037	0.112			-0.102
			(0.104)	(0.141)			(0.12)
Treatment X 2007			-0.408***	-0.477***			-0.479***
			(0.101)	(0.158)			(0.115)
Treatment X 2008			-0.344***	-0.328**			-0.420***
			(0.111)	(0.15)			(0.127)
Treatment X 2009			-0.408***	-0.552***			-0.734***
			(0.115)	(0.149)			(0.126)
Treatment X 2010			-0.333***	-0.402***			-0.615***
			(0.12)	(0.145)			(0.126)
Treatment X 2011			-0.386***	-0.467***			-0.690***
			(0.126)	(0.157)			(0.13)
Treatment X 2012			-0.1	0.143			-0.729***
			(0.129)	(0.178)			(0.129)
Mean of Dependent Variable	11.7	14.8	11.7	10.9	12.2	14.8	12.2
Observations	19043	18747	19043	18180	14025	13920	14025

Note: This table reports the timing of the Lacey Act on US imports of Timber relative to the the EU imports of timber and US imports of works of art. The panel includes 158 and 183 exporter countries respectively and uses data from 2003-2012. The dependent variable is the ln(imports) as reported by the importer region. Treatment is a US dummy for columns (1)-(4) and Timber dummy for columns (5)-(7). The control group is imports of timber in the EU for columns (1)-(4) and US imports of works of art for columns (5)-(7). Columns (1)-(4) include Region by Year, Importer by Exporter and Product fixed effects. Columns (5)-(7) include Region by Year, Exporter and Product fixed effects. For description of variables, please refer to table 1.1. Regions are defined as North America and the Caribbean, Latin America, Europe, Africa, Asia, Oceania, and the Middle East. Robust standard errors in parentheses are clustered by exporter country.

Table 1.5: The Effect of the Lacey Act on Timber Reporting Gap vs EU Timber Reporting Gap

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
USA x $I_{year \geq 2008}$	-0.766***	-0.768***	-0.752***	-0.770***	-0.688***	-0.648***	-0.496**	-0.236
	(0.200)	(0.198)	(0.196)	(0.196)	(0.198)	(0.198)	(0.227)	(0.159)
Ln(GDPPCUS)		-0.465	-0.540	-0.530	-0.502	-0.652	-0.750	
		(1.867)	(1.829)	(1.809)	(1.850)	(1.767)	(1.459)	
Corruption			-0.978	-0.950	-1.015	-0.964	-0.818	
			(0.945)	(0.937)	(0.956)	(0.894)	(0.900)	
Product FE	Yes	Yes	Yes	.	.	.	.	.
Region X Year FE	Yes	Yes	Yes	Yes	Yes	Yes	.	.
Importer X Exporter FE	Yes	Yes	Yes	Yes	Yes	.	.	.
Importer X Product FE	No	No	No	Yes	Yes	.	.	.
Exporter X Product Fe	No	No	No	No	Yes	.	.	.
Importer X Exporter X Product FE	No	No	No	No	No	Yes	Yes	Yes
Product X Year FE	No	No	No	No	No	No	Yes	Yes
Exporter X Year FE	No	No	No	No	No	No	No	Yes
Mean of Dependent Variable	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01
Observations	22299	22299	22299	22299	22299	22299	22299	22299

Note: This table reports the effect of the Lacey Act on US reporting gap relative to the EU reporting gap. The panel is made of importer region (US and EU) by 158 exporter countries and 21 HS 4 digit product codes for timber, over the period 2003-2012. The dependent variable is the difference in the reporting gap measured as $ln(imports_{dcyi})$ - $ln(exports_{dcyi})$. US is an indicator equal to 1 if importer is the US and 0 if importer is the EU. For description of variables, please refer to table 1.1. Regions are defined as North America and the Caribbean, Latin America, Europe, Africa, Asia, Oceania, and the Middle East. Robust standard errors in parentheses are clustered by exporter country.

Table 1.6: The Effect of the Lacey Act on Timber Reporting Gap vs Reporting Gap in Works of Art

	(1)	(2)	(3)	(4)	(5)	(6)
Timber X $I_{year \geq 2008}$	-0.869***	-0.869***	-0.874***	-0.874***	-0.625***	-0.570**
	(0.250)	(0.250)	(0.252)	(0.252)	(0.232)	(0.237)
Ln(GDPPCUS)			-0.632	-0.648	-0.885	
			(1.459)	(1.474)	(1.389)	
Corruption				-0.112	-0.264	
				(0.595)	(0.519)	
Exporter FE	Yes	Yes	Yes	Yes	.	.
Product FE	Yes	Yes	Yes	Yes	.	.
Region X Year FE	Yes	Yes	Yes	Yes	Yes	.
Exporter X Product Fe	No	No	No	No	Yes	Yes
Exporter X Year FE	No	No	No	No	No	Yes
Mean of Dependent Variable	1.73	1.73	1.73	1.73	1.73	1.73
Observations	17009	17009	17009	17009	17009	17009

Note: This table reports the impact of the Lacey Act on the US timber reporting gap relative to the US reporting gap in works of art. The panel is made of 183 exporter countries and 21 and 7 HS 4 digit product codes for timber and works of art respectively, over the period 2003-2012. The dependent variable is the difference in the reporting gap measured as $ln(imports_{dcyi})$ - $ln(exports_{dcyi})$. Timber is an indicator equal to 1 if HS Code is 44 and 0 if HS Code is 97. For description of variables, please refer to table 1.1. Regions are defined as North America and the Caribbean, Latin America, Europe, Africa, Asia, Oceania, and the Middle East. Robust standard errors in parentheses are clustered by exporter country.

Table 1.7: The Effect of the Lacey Act on Timber Reporting Gap - Robustness

	Control: EU27					Control: Works of Art - HS code 97				
	(1) Baseline	(2) Weighted	(3) PosCensor	(4) NegCensor	(5) Timing	(6) Baseline	(7) Weighted	(8) PosCensor	(9) NegCensor	(10) Timing
Treatment X $I_{year \geq 2008}$	-0.752***	-0.251	-0.281*	-0.471***		-0.874***	-0.473	-0.496***	-0.377***	
	(0.196)	(0.263)	(0.148)	(0.098)		(0.252)	(0.313)	(0.176)	(0.108)	
Ln(GDPPCUS)	-0.540	5.704	-0.187	-0.353	-0.536	-0.648	1.785	-0.555	-0.093	-0.664
	(1.829)	(3.852)	(1.527)	(0.431)	(1.816)	(1.474)	(3.347)	(1.171)	(0.445)	(1.468)
Corruption	-0.978	0.883	-0.721	-0.257	-0.978	-0.112	1.320	-0.163	0.051	-0.108
	(0.945)	(1.320)	(0.780)	(0.224)	(0.938)	(0.595)	(0.933)	(0.456)	(0.198)	(0.592)
Treatment X 2003					0.128					0.944**
					(0.342)					(0.413)
Treatment X 2004					0.203					0.107
					(0.324)					(0.373)
Treatment X 2005					0.469					0.162
					(0.336)					(0.363)
Treatment X 2006					-0.137					-0.315
					(0.255)					(0.315)
Treatment X 2008					-0.374					-0.228
					(0.276)					(0.357)
Treatment X 2009					-0.472*					-0.799**
					(0.282)					(0.347)
Treatment X 2010					-0.654**					-0.904**
					(0.285)					(0.397)
Treatment X 2011					-0.998***					-0.758**
					(0.322)					(0.376)
Treatment X 2012					-0.649**					-0.860**
					(0.281)					(0.400)
Mean of Dependent Variable	2.01	1.15	3.43	-1.42	2.01	1.73	0.818	3.4	-1.67	1.73
Observations	22299	21928	22299	22299	22299	17009	16852	17009	17009	17009

Note: This table reports robustness checks for the effect of the Lacey Act on US timber imports relative to the EU-27 timber imports and US imports of works of art. The panel includes 158 and 183 exporter countries respectively and uses data from 2003-2012. The dependent variable is the difference in the reporting gap measured as $ln(imports_{dcyi})$ - $ln(exports_{dcyi})$. Treatment is a US dummy for columns (1)-(5) and Timber dummy for columns (6)-(10). The control group is imports of timber in the EU-27 for columns (1)-(5) and US imports of works of art for columns (6)-(10). Columns (1)-(5) include Region by Year, Importer by Exporter and Product fixed effects. Columns (6)-(10) include Region by Year, Exporter and Product fixed effects. For description of variables, please refer to table 1.1. Regions are defined as North America and the Caribbean, Latin America, Europe, Africa, Asia, Oceania, and the Middle East. Robust standard errors in parentheses are clustered by exporter country.

Table 1.8: Heterogeneous Effect of the Lacey Act on the US Reporting Gap

	(1)	(2)	(3)	(4)
Ln(GDPPCUS)	-0.791	-1.030	-1.228	-1.193
	(1.550)	(1.949)	(1.947)	(1.979)
Corruption	0.096	-0.013	0.240	0.295
	(0.782)	(0.768)	(0.695)	(0.679)
Corruption X $I_{year \geq 2008}$	-0.576**	-0.584*	-0.639*	-0.633*
	(0.232)	(0.346)	(0.334)	(0.327)
Year FE	Yes	.	.	.
Exporter FE	Yes	Yes	.	.
Product FE	Yes	Yes	.	.
Region X Year FE	No	Yes	Yes	Yes
Exporter X Product FE	No	No	Yes	Yes
Product X Year FE	No	No	No	Yes
Mean of Dependent Variable	.387	.387	.387	.387
Observations	11588	11588	11588	11588

Note: This table reports the heterogeneous effect of the Lacey Act on US reporting gap for timber. The panel is made of 170 exporter countries and 21 HS 4 digit product codes for timber, over the period 2003-2012. The dependent variable is the difference in the reporting gap measured as $ln(imports_{dcyi})$ - $ln(exports_{dcyi})$. Corruption is a normalized index, with higher values indicating worse quality of governance. For description of other variables, please refer to table 1.1. Regions are defined as North America and the Caribbean, Latin America, Europe, Africa, Asia, Oceania, and the Middle East. Robust standard errors in parentheses are clustered by exporter country.

Table 1.9: Heterogeneous Effect of the Lacey Act on the US Reporting Gap - Robustness

	(1) Baseline	(2) Weighted	(3) QGap	(4) AbsGap	(5) PosGap	(6) PosCensor	(7) NegCensor	(8) Afr/Asia	(9) ROW	(10) Arts	(11) Toys
Ln(GDPPCUS)	-1.193	2.575	-1.497	0.876	0.248	-0.159	-1.035*	1.835	-3.098	0.178	-0.983
	(1.979)	(3.015)	(1.757)	(1.467)	(2.075)	(1.657)	(0.539)	(3.810)	(1.889)	(1.737)	(2.039)
Corruption	0.295	1.892*	0.245	0.161	-0.237	0.228	0.067	0.833	-0.174	-0.648	0.614
	(0.679)	(1.064)	(0.719)	(0.523)	(0.661)	(0.568)	(0.211)	(1.319)	(0.732)	(0.741)	(0.688)
Corruption X $I_{year \geq 2008}$	-0.633*	-0.560	-0.594*	-0.627***	-0.614**	-0.630**	-0.003	-1.247*	-0.392	-0.337	
	(0.327)	(0.395)	(0.337)	(0.228)	(0.260)	(0.265)	(0.097)	(0.628)	(0.388)	(0.300)	
2004 X Corruption											-0.352
											(0.230)
2005 X Corruption											-0.199
											(0.273)
2006 X Corruption											-0.607*
											(0.314)
2007 X Corruption											-0.412
											(0.338)
2008 X Corruption											-0.975**
											(0.477)
2009 X Corruption											-0.953**
											(0.440)
2010 X Corruption											-0.984**
											(0.477)
2011 X Corruption											-1.077**
											(0.429)
2012 X Corruption											-0.817
											(0.504)
Mean of Dependent Variable	.387	.381	-.146	4.49	4.42	2.44	-2.05	1.96	-.315	2.42	.387
Observations	11588	11517	11588	11588	6388	11588	11588	3577	8011	16639	11588

Note: This table reports the heterogeneous effect of the Lacey Act on US reporting gap for timber. The panel is made of 170 exporter countries and 21 HS 4 digit product codes for timber, over the period 2003-2012. The dependent variable is the difference in the reporting gap measured as $ln(imports_{dcyi})$ - $ln(exports_{dcyi})$. Corruption is a normalized index, with higher values indicating worse quality of governance. For description of other variables, please refer to table 1.1. All columns include Region by Year, Exporter by Product and Product by Year fixed effects. Regions are defined as North America and the Caribbean, Latin America, Europe, Africa, Asia, Oceania, and the Middle East. Robust standard errors in parentheses are clustered by exporter country.

Table 1.10: Heterogeneous Effect of the Lacey Act on the Importer Versus Exporter Reporting

	(1)	(2)	(3)	(4)
Dependent variable: Ln(Imports), Mean: 8.90, N:13779				
Ln(GDPPCUS)	-0.036	-0.755	-1.273	-1.491
	(1.114)	(1.009)	(1.026)	(1.094)
Corruption	0.124	0.068	0.247	0.266
	(0.449)	(0.417)	(0.376)	(0.387)
Corruption X $I_{year \geq 2008}$	-0.093	-0.038	0.014	0.000
	(0.100)	(0.130)	(0.117)	(0.119)
Dependent variable: Ln(Exports), Mean: 9.57, N:13779				
Ln(GDPPCUS)	0.490	0.313	-0.375	-0.428
	(0.948)	(1.226)	(1.284)	(1.298)
Corruption	-0.371	-0.308	-0.371	-0.401
	(0.451)	(0.436)	(0.451)	(0.455)
Corruption X $I_{year \geq 2008}$	0.488***	0.542**	0.624**	0.620**
	(0.158)	(0.241)	(0.245)	(0.241)
Year FE	Yes	.	.	.
Exporter FE	Yes	Yes	.	.
Product FE	Yes	Yes	.	.
Region X Year FE	No	Yes	Yes	Yes
Exporter X Product FE	No	Yes	No	Yes
Product X Year FE	No	No	Yes	Yes

Note: This table reports the heterogeneous effect of the Lacey Act on importer versus exporter reporting. The panel is made of 170 exporter countries and 21 HS 4 digit product codes for timber, over the period 2003-2012. The dependent variable is the difference in the reporting gap measured as $ln(imports_{dcyi})$ - $ln(exports_{dcyi})$. Corruption is a normalized index, with higher values indicating worse quality of governance. For description of other variables, please refer to table 1.1. Regions are defined as North America and the Caribbean, Latin America, Europe, Africa, Asia, Oceania, and the Middle East. Robust standard errors in parentheses are clustered by exporter country.

Table 1.11: Deforestation Summary Statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Pixel Count	701.958	890.546	12.298	3764.079	194
Ln(Count)	12.582	1.437	9.417	15.141	194
Corruption	0.021	0.907	-1.59	1.574	194
Ln(Real GDP)	9.816	1.097	7.545	11.809	194
Forest Concessions	12.979	18.276	0	87	194

Note: This table reports the summary statistics for the variables used in the empirical analysis for the impact of the Lacey Act on deforestation in Indonesia. Pixel count is the annual average number of 30m x 30m pixels deforested in a given region. Corruption is a normalized index with higher values indicating worst quality of governance. Real GDP is measured in billions of Rupiahs and forest concessions are annual average number of concessions in a given region.
Source: Global Forest Change, Pusat Statistik and Transperancy International Indonesia.

Table 1.12: The Lacey Act and Deforestation in Indonesia

	(1) Count	(2) Count	(3) Count	(4) Count	(5) Ln(Count)	(6) Count	(7) Count
Corruption X $I_{year \geq 2008}$	-60.110	-81.195	-183.747*	-163.615*	-0.107	-0.110	
	(51.804)	(54.833)	(95.431)	(92.174)	(0.084)	(0.074)	
Ln(Real GDP)		-825.688**	-1035.576**	-958.241**	-1.219**	-1.572***	-1126.364***
		(368.298)	(372.857)	(404.859)	(0.567)	(0.452)	(375.753)
Forest Concessions			13.582**		0.005	0.008*	14.125**
			(6.353)		(0.007)	(0.004)	(6.015)
Corruption X 2005							-127.278
							(113.087)
Corruption X 2006							41.611
							(88.813)
Corruption X 2007							74.536
							(110.439)
Corruption X 2008							-50.507
							(135.762)
Corruption X 2009							-138.725
							(154.480)
Corruption X 2010							-241.679**
							(110.407)
Corruption X 2011							-246.626*
							(140.514)
Corruption X 2012							-271.948
							(203.213)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean of Dependent Variable							
Observations	297	297	194	194	194	194	194

Note: This table reports the effect of the Lacey Act on regional deforestation in Indonesia. Moving from column (5) to column (6), I lose 11 regions as these regions do not have significant parcels of forests and thus there is no forest concession data for them. The final panel includes 22 regions and uses data from 2004-2012. The dependent variable is a count of deforested pixels. Corruption is a normalized index, with higher values indicating worse quality of governance. For description of other variables, please refer to table 1.11. Robust standard errors in parentheses are clustered by region.

1.A Appendix A

Table 1.A.1: The Lacey Act and US Imports of Timber vs EU Imports of Timber - Aggregated

	(1)	(2)	(3)	(4)
USA X $I_{year \geq 2008}$	-0.367***	-0.354***	-0.423**	-0.358*
	(0.125)	(0.126)	(0.203)	(0.197)
Corruption	-0.252	-0.337	0.000	0.000
	(0.234)	(0.237)	(.)	(.)
Ln(GDPPCUS)	0.442	0.797	0.000	0.000
	(0.565)	(0.590)	(.)	(.)
Year FE	Yes	.	.	.
Exporter FE	Yes	Yes	.	.
Region X Year FE	No	Yes	.	.
Exporter X Year FE	No	No	Yes	Yes
Importer X Exporter FE	No	No	No	Yes
Mean of Dependent Variable	14.1	14.1	14.1	14.1
Observations	2721	2721	2721	2721

Note: This table reports the effect of the Lacey Act on US imports relative to the EU. The panel is made of importer region (US and EU) by 158 exporter countries over the period 2003-2012. The dependent variable is the ln(imports) as reported by the importer region. US is an indicator equal to 1 if importer is the US and 0 if importer is the EU. For description of variables, please refer to table 1.1. Regions are defined as North America and the Caribbean, Latin America, Europe, Africa, Asia, Oceania, and the Middle East. Robust standard errors in parentheses are clustered by exporter country.

Table 1.A.2: The Lacey Act and US Imports of Timber vs Imports of Works of Art - Aggregated

	(1)	(2)	(3)	(4)
Timber X $I_{year \geq 2008}$	-0.694***	-0.671***	-0.627***	-0.799***
	(0.112)	(0.112)	(0.177)	(0.172)
Corruption	-0.095	-0.047	0.000	0.000
	(0.169)	(0.175)	(.)	(.)
Ln(GDPPCUS)	-0.036	-0.096	0.000	0.000
	(0.551)	(0.544)	(.)	(.)
Year FE	Yes	.	.	.
Exporter FE	Yes	Yes	.	.
Region X Year FE	No	Yes	.	.
Exporter X Year FE	No	No	Yes	Yes
Product X Exporter FE	No	No	No	Yes
Mean of Dependent Variable	13.8	13.8	13.8	13.8
Observations	2841	2841	2841	2841

Note: This table reports the effect of the Lacey Act on US imports relative to the EU. The panel is made of importer region (US and EU) by 183 exporter countries and 2 HS 2 digit products codes, over the period 2003-2012. The dependent variable is the ln(imports) as reported by the importer region. Timber is an indicator equal to 1 if HS Code is 44 and 0 if HS Code is 97. For description of variables, please refer to table 1.1. Regions are defined as North America and the Caribbean, Latin America, Europe, Africa, Asia, Oceania, and the Middle East. Robust standard errors in parentheses are clustered by exporter country.

Table 1.A.3: Correlation Between Corruption and Timber Smuggling

	Timber - HS code 44					Work of Art - HS code 97	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Corruption	0.901***		0.428	0.755**	-0.477	2.402***	0.128
	(0.220)		(0.316)	(0.356)	(0.773)	(0.426)	(0.651)
Ln(GDPPCUS)		-0.675***	-0.407	0.029	-2.355	0.128	1.972
		(0.173)	(0.260)	(0.353)	(1.915)	(0.329)	(1.528)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region X Year FE	No	No	No	Yes	Yes	Yes	Yes
Exporter FE	No	No	No	No	Yes	Yes	Yes
Mean of Dependent Variable	.387	.387	.387	.387	.387	4.61	4.61
Observations	11588	11588	11588	11588	11588	5421	5421

Note: This table replicates the correlations presented in table 2 of Fisman and Wei (2009) for the reporting gap in timber and works of art. The panel includes 170 and 182 exporter countries respectively and uses data from 2003-2012. For description of other variables, please refer to table 1.1. Robust standard errors in parentheses are clustered by exporter country.

Table 1.A.4: Heterogeneous Effect of the Lacey Act on the Composition of US Trading Partners

	(1)	(2)	(3)	(4)
Ln(GDPPCUS)	2.983	2.879	2.936	2.968
	(2.151)	(2.036)	(2.164)	(2.094)
Corruption	0.333	0.228	0.217	0.178
	(0.230)	(0.192)	(0.200)	(0.226)
Corruption X $I_{year \geq 2008}$	-0.007	-0.005	-0.020	-0.008
	(0.099)	(0.076)	(0.066)	(0.055)
Year FE	Yes	.	.	.
Exporter FE	Yes	Yes	.	.
Product FE	Yes	Yes	.	.
Region X Year FE	No	Yes	Yes	Yes
Exporter X Product FE	No	Yes	No	Yes
Product X Year FE	No	No	Yes	Yes
Mean of Dependent Variable	2.09	2.09	2.09	2.09
Observations	9927	9927	9927	9927

Note: This table reports the heterogeneous effect of the Lacey Act on exporter country's share of US Timber imports. The panel includes 165 exporter countries and uses data from 2003-2012. The dependent variable is the difference in the reporting gap measured as $ln(imports_{dcyi})$ - $ln(exports_{dcyi})$. Corruption is a normalized index, with higher values indicating worse quality of governance. For description of other variables, please refer to table 1.1. Regions are defined as North America and the Caribbean, Latin America, Europe, Africa, Asia, Oceania, and the Middle East. Robust standard errors in parentheses are clustered by exporter country.

1.B Appendix B

Figure 1.B.1: 109 Years of Conservation Law Evolves to Protect Timber

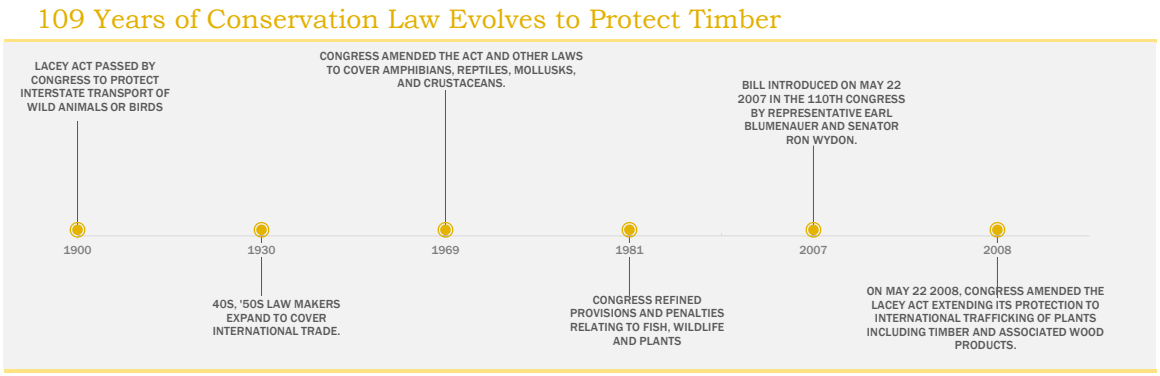


Figure 1.B.2: Schedule of Enforcement

Schedule of Enforcement of the Plant and Plant Product Declaration Requirement*

(This Version - dated October 29, 2013 - supersedes all previous versions)

HTS Chapters Requiring Plant and Plant Product Declaration (examples of products requiring declaration):

Ch. 44 Headings

- 4401— (Fuel wood) [1]
- 4402— (Wood charcoal) [2]
- 4403— (Wood in the rough) [1]
- 4404— (Hoopwood; poles, piles, stakes) [1]
- 4406— (Railway or tramway sleepers) [1]
- 4407— (Wood sawn or chipped lengthwise) [1]
- 4408— (Sheets for veneering) [1]
- 4409— (Wood continuously shaped) [1]
- 4412— (Plywood, veneered panels) [2]
  -Except 44129906 and 44129957
- 4414— (Wooden frames) [2]
- 4417— (Tools, tool handles, broom handles) [1]
- 4418— (Builders' joinery and carpentry of wood) [1]
- 4419— (Tableware & kitchenware of wood) [2]
- 4420— (Wood marquetry, caskets, statuettes) [2]
- 4421— (Other articles of wood) [3]

Ch. 66 Headings

- 6602—(Walking sticks, whips, crops) [3]

Ch. 82 Headings

- 8201—(Hand tools) [3]

Ch. 92 Headings

- 9201—(Pianos) [3]
- 9202—(Other stringed instruments) [3]

Ch. 93 Headings

- 9302—(Revolvers and pistols) [3]
- 93051020—(Parts and accessories for revolvers and pistols) [3]

Ch. 94 Headings

- 940169—(Seats with wood frames) [3]

Ch. 95 Headings

- 950420—(Articles and accessories for billiards) [3]

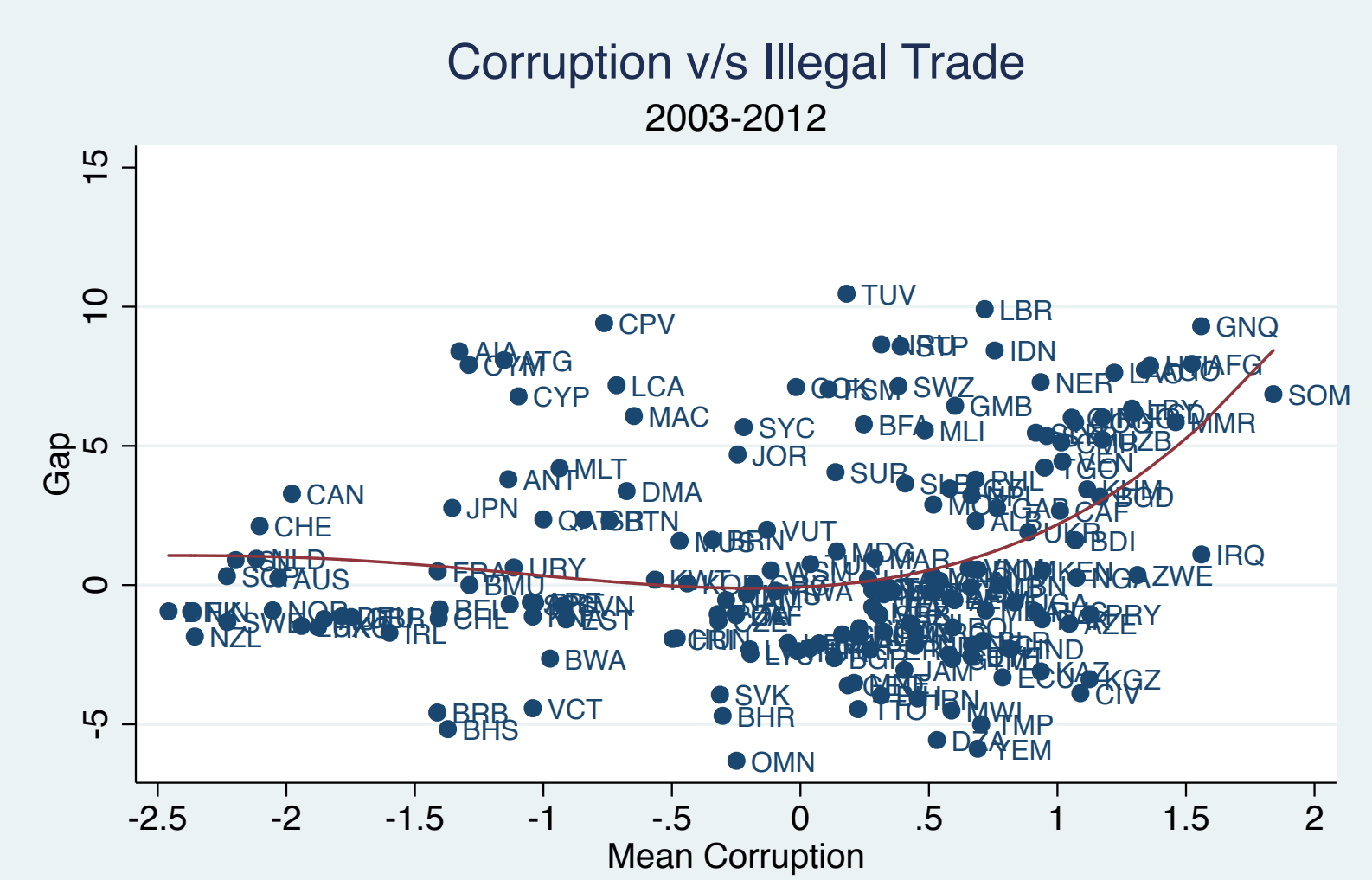
Ch. 97 Headings

- 9703—(Sculptures) [3]

*All declarations submitted must be accurate; false statements may be referred for enforcement. Failure to submit a declaration will not be prosecuted, and customs clearance will not be denied for lack of a declaration until after the phase-in date above.

[1] Phase 2 Implementation – Declaration required effective April 1, 2009
[2] Phase 3 Implementation – Declaration required effective October 1, 2009
[3] Phase 4 Implementation – Declaration required effective April 1, 2010

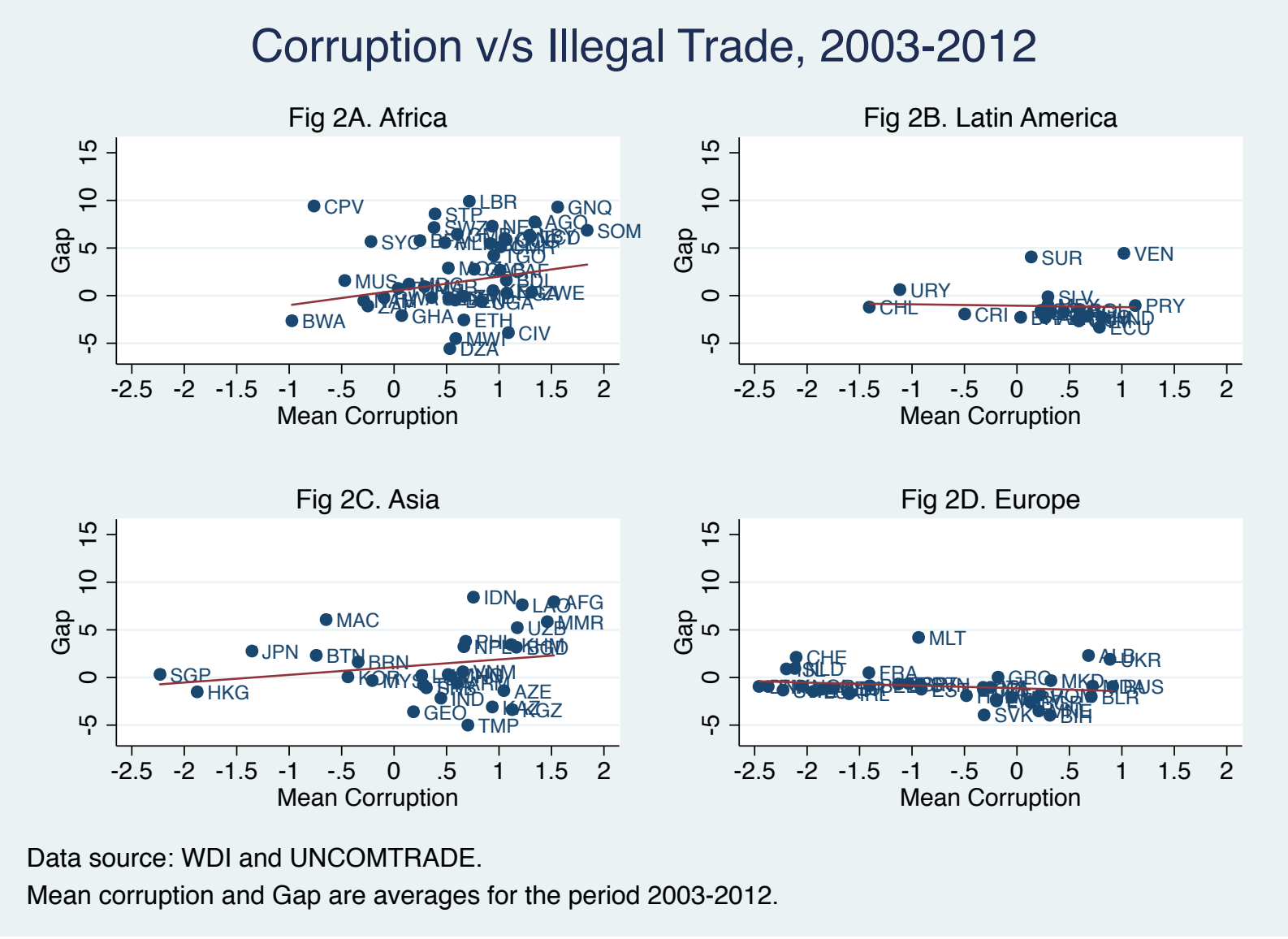
Figure 1.B.3: Corruption vs Illegal Trade



Data source: WDI and UNCOMTRADE.

Mean corruption and Gap are averages for the period 2003-2012.

Figure 1.B.4: Corruption vs Illega by Regions



Data source: WDI and UNCOMTRADE.

Mean corruption and Gap are averages for the period 2003-2012.

Chapter 2

More than an Urban Legend: The Long-term Socio-economic Effects of Unplanned Fertility Shocks

Power outages or blackouts are a recurrent feature in many developing countries across the world. Anecdotal evidence has suggested increased fertility rates resulting 9 months after the blackout as peoples' procreation increases when lights go out. The idea of baby booms following a blackout has been a subject of contention for a long time. It first came into prominence in popular culture after the great New York blackout of 1965 which left over 30 million people without electricity for 13 hours. However, the seminal work by Udry (1970) concluded that there was no significant impact of the great New York blackout on fertility 9 months later. Since then, the theory has been termed as an "urban legend" by the President of the Population Association of America .

Unlike the New York blackout or indeed most power outages in the developed world, which are limited in time and space, developing countries have been experiencing great power uncertainty. Many states in Africa experience rolling blackouts that last weeks if not months and for several hours a day[1]. Thus, though the evidence may lack in support of baby booms after a black out in developed countries, the frequency of blackouts over a longer period of time make it more plausible to causally link blackouts in developing countries to baby booms 9 months later.

If periods of unexpected power rationing entail baby booms, there may also be large *hidden social costs*. The change in fertility behavior has implications for investment in human capital and asset accumulation in general, affecting the labor market outcomes and the life path of mothers and their children in the longer run. This chapter shows that extensive periods of power rationing entail changes in fertility behavior and that these changes induce large social costs.

[1]Reliable electricity provision has been identified as a key driver for growth (see Dinkelman, 2011). In developing countries, electricity supply to firms and households is extremely erratic, constraining development (see Abeberese, 2012; Fisher-Vanden et al., 2012; Foster and Steinbuks, 2009; Reinikka and Svensson, 2002)

Our chapter makes two main contributions. First, we provide evidence that there is a causal effect of power outages on short and long run fertility. We examine a particular black out in Colombia caused by the El-Nino droughts in 1992, leading to a period of almost 12 months of daily rationing of electricity. In order to identify the effect of the rolling blackout, we construct two novel datasets. First we use the IPUMS micro sample for the 2005 population census of Colombia to construct a retrospective mother level birth history by linking mothers to children within the household. We combine this dataset with municipality level variation in night lights as measured by satellite images for the period 1992/1993 and construct a variable of treatment intensity for the power crisis. An ideal experiment would entail random assignment of the treatment intensity, however, we make do with a quasi-random experiment: because it was caused by an unforeseen climate change phenomenon, it was unexpected; it lasted for one year, long enough for sufficient statistical power to detect the impact on fertility and long run family size; and, it affected the whole country, thus it was very clearly delimited in time and space. Finally, by using the retrospective mother data, we estimate the impact of the blackout over time within the same mother, thus addressing concerns of targeting treatment to specific areas for political reasons. We document an increase of 0.005 percentage points in the probability of having a child in 1993. When evaluated at the mean probability of having a child in any given year, this results into an increase in probability of having a birth by 5 percent. Using the mean intensity of the power outage across Colombia, we are able to calculate a back of the envelope estimate of approximately 10,000 additional births in 1993 due to the blackout.

Next, we show that this increase in short-term fertility is not dynamically adjusted for through less children in the future, implying an overall increase in total number of children 12 years later. We use an empirical design on a cross-section of mothers, where the counterfactual are women, who were exposed to the power outage but could not physically conceive because they had just delivered a baby. Additional placebo exercises confirm this finding. Further, consistent with our priors, younger mothers (aged 30 or less in 1992) respond to the treatment in 1993, however, they are also better able to adjust their lifetime fertility in the longrun. On the contrary, though the older cohort has a weaker response to the blackout in 1993, they are less likely to be able to adjust their lifetime fertility due to an unexpected baby, thus driving most of our long-run effect. We conclude that 1 out of 10 blackout babies was not fully adjusted for 12 years later. Given the small size of the short and longrun effects, we are not surprised that most demographers have failed to find any significant effects of power outages on fertility.

Our second key contribution is to use the black-out intensity as an instrument for total fertility, to study the effect of the fertility shock on socio-economic outcomes of mothers who had an unintended pregnancy. This is a question that is of key interest to labor economists (see e.g. Angrist and Evans, 1998; Ashcraft and Lang, 2006), but has mainly been studied in developed country contexts. Our first stage is the

overall increase in lifetime fertility due to the power outage. We use the variation in total, unadjusted fertility to study how socio-economic outcomes vary across mothers. The biggest challenge is to ensure there is no violation of the exclusion restriction. Of major concern is the fact that the blackout could have a direct effect on the longrun socioeconomic outcomes of mothers in its own right. Our choice of control group alleviates many of these concerns, since both treatment and control were exposed to the power outage (and thus, a possible income shock), but only the treatment group could physically receive the treatment. This mitigates some of the major concerns related to the exclusion restriction.

Despite fertility being a complex phenomenon, we are able to paint a consistent picture of the negative consequences of unplanned motherhood following the black-out. We provide evidence showing that women who had an unplanned baby due to the black-out end up with worse education levels and are more likely to be single mothers living in poorer housing conditions. These findings suggest that there may have been significant welfare consequences through long-term persistence of the shock, contrary to life-cycle theory. Finally, to our knowledge this is the first chapter to link long run socioeconomic outcomes of power rationing on unplanned motherhood and more generally the long-run consequences of unintended pregnancies in a developing country context.

This chapter contributes to several strands of literature. Firstly, it contributes to a limited but growing empirical literature on examining the impact of electricity infrastructure in developing countries (see Dinkelman, 2011; Rud, 2012). In particular, it provides evidence on the influence of infrastructure on fertility behavior. On this strand, the work most closely related to ours is Burlando (2012), who looks at the impact of a month-long power outage in Zanzibar on village-level fertility outcomes. He finds a mini baby boom 9 months after the blackout, with an increase in village level births by 20%.[2]

Second, this chapter also contributes to understanding fertility response to other aggregate shocks. For example, Evans et al. (2008) and Pörtner (2008) study the effect of natural disasters and hurricanes in particular. They find a negative relationship between hurricane advisories and baby booms 9 months after the event. As the type of advisory goes from least severe to most severe, the fertility effect of the specific advisory type decreases monotonically from positive to negative.[3]

Finally, we also provide evidence on the long-run consequences of unwanted pregnancies and the effect of children on their mother's labor market and socio-economic outcomes (Angrist and Evans, 1998; Jacobsen et al., 2007). In the Colombian context, this is particularly worrying as unwanted pregnancies and too-early childbearing are common in Latin America and the Caribbean. According to Koontz and Conly (1994), women who begin childbearing as teenagers are estimated to have

[2]In related work, Burlando (2012) finds that in-utero exposure of the mother to the power outage resulted in lower birth weight.

[3]Our study also speaks to the literature understanding the role of culture, media and leisure on fertility (Ferrara et al., 2012; Jensen and Oster, 2009; Kearney and Levine, 2014). These studies have found a link between television programming and fertility behavior, including smaller family sizes.

two to three more children than women who delay their first birth until their twenties or later (Gutmacher Institute, 1997). Not only does early motherhood lead to more children in the future, but high adolescent fertility rates are linked to low educational attainment and poverty (Koontz and Conly, 1994). In developed countries the findings are similar, where early motherhood leads to lower education outcomes, worst housing condition and labor market outcomes (Levine and Painter, 2003; Ashcraft and Lang, 2006; Kaplan et al., 2004).

This chapter is, to our knowledge, the first study to look at mother-level impact of an aggregate shock like power outages on short and long run fertility outcomes. This represents a potential improvement over previous studies, which have used twins and siblings to study the impact on mothers' labor market outcomes. The chapter is broader as we do not restrict the sample of mothers to those who only gave birth to twins for instance, this helps to overcome the external validity concerns that these other approaches suffer from. Indeed, there is the question of how representative are the mothers who respond to the treatment to the general population, however, given the type of treatment we consider, this is precisely the vulnerable group one would be interested in when making policy decisions. We also make significant contributions on the methodological front by combining aggregate night light data to micro data sets.

The rest of the chapter proceeds as follows. Section 2 provides a brief background the context of the 1992 black out in Colombia. In Section 3, we present a stylized model that gives us some testable predictions. In section 4 we describe the data and how we constructed our main dependent variables. Section 5 provides the empirical strategy and the key results. The conclusion follows in Section 6.

2.1 Context

In 1992 Colombia derived roughly 80 % of its electricity consumption from hydroelectric sources. About 40% of this energy is produced in fourteen hydro-electric power plants that are located mainly in the Caldas and Antioquia departments of central Colombia. These are located to the north and east of Medellin, where the Mountain ranges of the Andes typically provide ample rainfall runoff water that may be used for hydroelectric power generation.

Especially Antioquia departmento, highlighted in Figure 2.1.1, is a major location for hydro-electric power generation. It has several power plants that are sited between two rivers, being supplied with water from one and emptying the water into another after it passes through the turbines. This makes these power plants particularly vulnerable to reductions in water flows.[4]

In 1992, El Nino droughts led to a dramatic depletion of water reservoirs that feed most major power plants. Some power stations needed to cut back power

[4]Department of Energy, An Energy Overview of Colombia, `http://goo.gl/nnhWBN`.

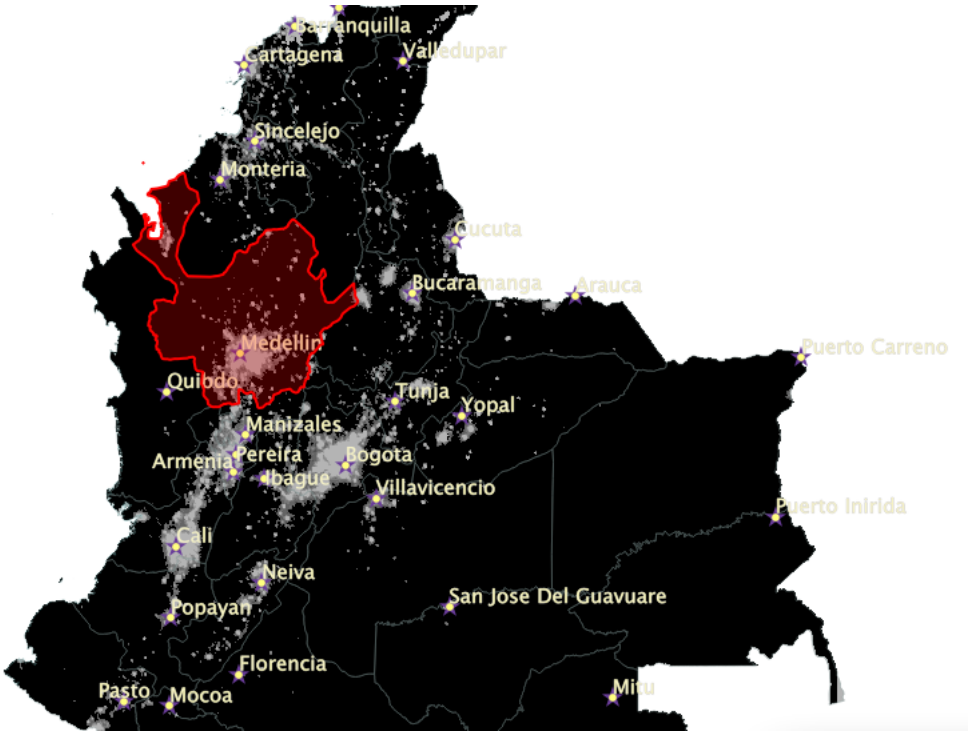


Figure 2.1.1: Colombia Administrative Regions, Night Lights Emissions in 1992 and Provincial Capital Cities. Antioquia departmento is highlighted.

production dramatically as there was simply a lot less water to produce electricity with. One of the biggest energy firms estimated that throughout the year there was a shortfall equivalent to roughly 20% of the annual production of 1991.[5]

The resulting power rationing was felt by Colombians across the country, which is why the period from 1992 to 1993 is referred to by Colombians simply as the "Black Out". There are no country-wide figures available, as even for some departments, no power production or consumption data is available for that period. However, for our purposes it is important to note that the short-fall in production was not evenly spread across the country. In the north-east, historically thermal power generation from coal has been available and some parts of the South had not been connected to the national electricity grid. Further, electricity losses along the transmission lines generate a natural gradient. All these contribute to creating spatial variation in the intensity of the power rationing.[6]

Since 1993, Colombia has had a very stable electricity supply. In response to the power outages and rolling black-outs of 1993, the government heavily invested in infrastructure and de-regulation of the energy sector.[7] The previous period of

[5]See `http://www.tebsa.com.co/history.htm`, accessed on 20.06.2013.

[6]This is akin to Costa (2013), who studies the long run effects of power rationing in the South of Brazil due to power production shortages following droughts in 2001. The lack of integration in the power network created distinct spatial variation in the extent of power rationing in his context.

[7]In particular, a lot of investment has also been made to increase access to on-demand thermal power plants capacity. According to `https://www.cia.gov/library/publications/the-world-factbook/geos/co.html`, the share of hydroelectric power generation capacity is now only 67%.

power rationing caused by low hydro inflows due to climate phenomenon was in 1983 (McRae, 2010). Based on various newspaper articles surveyed by us from the period, timing of the previous drought driven black-out and the strong response of the government to the shock, all provide support for treating the 1992/93 episode as un-anticipated.

We now turn to the conceptual framework, before presenting the specification and our key results.

2.2 Conceptual Model

The Colombian blackout of 1992 might have had an impact on fertility behavior through different channels. Many people, if not losing their jobs, were forced to get back home earlier from work, given the scheduled blackout times. Leisure activities outside home were less attractive if not more dangerous because of the lack of nightlight. Inside the household, leisure activities involving electricity became prohibitively expensive at the running blackout times. All these channels suggest that the opportunity cost of sex decreased as a consequence of the blackout.

The dominance of these substitution effects is not straightforward, though. If childbearing is costly, less current income decreases the present value of wealth, which decreases the affordability of children in the future and therefore reduces sex activity in the present [8]. Additionally, disposition towards sex activity might decrease as income falls (e.g. stress). These wealth and income effects might dominate the substitution effects and therefore the effect of the blackout on fertility is theoretically ambiguous.

We identify two channels through which the blackout affects welfare (apart form those directly related to shortages of energy in the production process). Firstly, if the substitution effect dominates, population will increase as a consequence of the blackout. This is the case even if the total number of children across the lifetime of a woman remains constant. The reason for this is that girls who were born as a consequence of the blackout would have children at an earlier date than if they were born later. Consequently, land and capital would be diluted among more people. Secondly, having children at an earlier stage might affect the life-cycle asset-accumulation of both parents and children. Parenthood might force early school retirement for teenage parents when children demand time and money. Unexpected children might have less access to nutrition and education than those who were planned.[9] For the purposes of the empirical exercise, the conceptual model focus on the effect on the parent's asset accumulation.

[8] As per the 1990 Colombia Demographic Health Survey, condom use was only prevalent amongst 1.6% of the respondents, while 35% of respondents were using no contraceptive method at all.

[9] Burlando (2014) finds evidence suggesting that in utero exposure to a power outage induced income effect resulted in lower birth weight.

2.2.1 Benchmark

We consider a simple model to highlight the channels through which the blackout affected sexual behavior, pregnancy and fertility in the short run and accumulation of human capital in the long run. We simplify the analysis by assuming that a woman's partner chooses the sexual activity frequency disregarding the consequences on her long-term outcomes. Women still have the last say on the number of children they have and on the education level they want to achieve, but family planning is costly and education more difficult when resources have to be allocated to childcare.

The intuition of the effect of the blackout is as follows. Sex is an activity that rivals in time with working and leisure activities. The blackout increases sex frequency since scheduled blackouts imply shorter working hours. As sexual activity increases, so does pregnancy. Since family planning is costly, it is not optimal for woman to fully offset the increase in pregnancy. Childcare rivals in time with study, therefore reducing woman's human capital.

To simplify the analysis, we depart from the standard unitary household model. Instead, women and men assume differentiated roles and do not take into account the effect their decisions have on their partners. In particular, men choose sexual frequency disregarding the effect on their partners, while the costs of childcare and family planning are exclusively assumed by women. In contrast, a forward-looking household would take into account how sexual frequency affects human capital acquisition. Earlier versions of this chapter included such a dynamic model, but the qualitative features of the model remained unchanged. The reader is asked to excuse us for presenting here a model which simplifies the analysis at the cost of acquiring sexist undertones.

The problem for a man is to choose the feasible amount of consumption and time allocated to sex and work that maximizes his utility. His utility depends on consumption (c) and on the fraction of time spent having sex (s). It is assumed that $u(c, s)$ is a quasi-concave function increasing on c and s. Sex is costly in terms of time, hence only combinations of non-negative amounts of x and s such that $x + s \leq 1$ are feasible. By working a fraction $x < \beta$ of time, he earns vx, where $v > 0$ represents the exogenous wage and $\beta > 0$ is an exogenous threshold. If working a fraction $x > \beta$ of the time, he earns $v\beta + \omega(x - \beta)$, where ω represents the marginal earnings working after a fraction β of the time.

The problem for a woman's partner is then

$$\max_{s,x,c \geq 0} u(c, s)$$

subject to $x + s \leq 1$ and to

$$c = \begin{cases} vx & \text{if } x \leq \beta \\ v\beta + \omega(x - \beta) & \text{if } x > \beta \end{cases}$$

Denote by $x(\omega)$ the optimal labor supply for a man. We assume that for all the cases of interest it is the case that $x(\omega) \in [\beta, 1)$. In particular, if $x(\omega) \in (\beta, 1)$, the solution is characterized by equating the marginal utility of sex with its opportunity cost:

$$u_s(c(\omega), s(\omega)) = \omega u_c(c(\omega), s(\omega)) \tag{2.1}$$

where $s(\omega)$ and $c(\omega)$ represent the optimal choices of sex and consumption, respectively.

Women allocate their time between education (e) and childcare. If a woman has to take care of n children, she has to spend a fraction γn of her time on childcare, where $\gamma > 0$ is a parameter that tells how costly is to raise children. The number of children n is a function of the frequency of sex activity s, chosen by her partner, and the level of family planning a, chosen by her. In particular, the number of children is

$$n = (1 - a)s \tag{2.2}$$

The monetary cost of family planning is given by $c(as)$, where $c(\cdot)$ is a real-valued, increasing, continuously differentiable and strictly convex function with $c'(0) = 0$ and $c'(\infty) = \infty$.

The utility a woman gets is a function of the net income she gets. Her income is a function of the time she spends on education and the cost of family planning. The return on education is given by the parameter $\alpha > 0$. Hence the problem for a woman is to

$$\max_{e \geq 0, a \in [0,1]} \alpha e - c(as)$$

subject to $e + \gamma(1 - a)s \leq 1$. Denote by $a(\omega)$ the optimal level of family planning for a woman when her partner chooses a frequency $s(\omega)$ of sex. If the optimal level of family planning is an interior solution, then the marginal cost of family planning equals its return in terms of income:

$$\alpha\gamma = c'(a(\omega)s(\omega)) \tag{2.3}$$

The fraction of time spend on education is obtained by noticing that $c'(\cdot)$ is an invertible function and using the time allocation constraint:

$$e(\omega) = 1 - \gamma s(\omega) + \gamma(c')^{-1}(\alpha\gamma) \tag{2.4}$$

At interior solutions, women do not fully offset the fertility choices of their partners.

2.2.2 Comparative statics

The blackout is modeled as a decrease on the marginal earnings from working at the scheduled blackout times, which is represented as a decrease in ω. Note that if ω falls to zero, this is equivalent to restricting the number of hours that can be worked to β. Implicitly, it is assumed that labor and electricity are complementary inputs

in the production process. As electricity starts to become rationed or prohibitively expensive, the demand for labor falls, decreasing ω.

Let ω denote the marginal earnings in normal times and $\omega' < \omega$ the marginal earnings during the blackout. From a comparative statics exercise on equation (2.1) it can be seen that the sign of $s(\omega') - s(\omega)$ is ambiguous. This is not surprising: on one hand, the substitution effect pushes s up as ω decreases. On the other, income and wealth effects could pull in the opposite direction. Note, however, that if the fall on ω is big enough, the substitution effect dominates. In the extreme case where ω drops to zero, then $x(0) = \beta$, unambiguously increasing sex frequency.

Let $n(\omega)$ and $n(\omega')$ the equilibrium number of children in normal times and during the blackout, respectively. It follows from equations (2.2) and (2.3) that the effect on the fertility is given by

$$n(\omega') - n(\omega) = s(\omega') - s(\omega) \tag{2.5}$$

where $s(\cdot)$ is characterized by equation (2.1). If the substitution effect dominates, the effect of the blackout on fertility is positive.

Testing whether there is an increase in fertility in response to the power outage will be the first of two steps of the empirical analysis. We study the immediate short-term fertility effect, but also focus on the dynamic, long-run effect on total fertility twelve years after the power outage [10].

The second major outcome which we address in our empirical strategy is human capital. Theoretically, the effect on human capital is given by

$$e(\omega') - e(\omega) = -\gamma(s(\omega') - s(\omega)) \tag{2.6}$$

which is derived from equation (2.4). The sign of this effect is negative if the substitution effect dominates. We study this empirically in subsection 2.4.3, where we look at the effect that an unplanned child has on mother-level long-run socio-economic outcomes.

As discussed in the beginning of this section, the blackout may affect fertility decisions through other channels. Other leisure activities (e.g. watching t.v.) could be introduced into the woman's partner (or the household's) utility function. The blackout could be seen as an increase on the cost of carrying out these activities. In this case, the substitution effect of the blackout would be intensified, the increase on fertility would be higher and the increase on educational achievement would be lower.

The next section discusses the data that we are using to study the short- and long-run effects of power rationing.

[10] A more dynamic model would capture the long-run adjustment of fertility behavior.

2.3 Data

2.3.1 Detecting Power Outages from Remote Sensing

Satellite-derived night lights data has been used by economist to map economic activity (see Doll, 2008), economic growth (Henderson et al., 2012) or the evolution of agglomeration clusters over time (see Storeygard, 2012; Fetzer and Shanghavi, 2014).

The data has the advantage of being available where reliable GDP statistics do not exist. Furthermore, they allow the study of the geography of urbanization. Other recent applications have been in the sphere of political economy, to map the role of ethnic origin of a leader and the provision of public goods (see Hodler and Raschky, 2014), again in contexts where data on the provision of these public goods is not available.

However, to the best of the knowledge of the authors, the night lights data has not been exploited to study abnormal variation in night-light intensity, which may be caused by power outages. In that way, the research breaks methodological ground as we show that the night light data can be used to obtain measures of the extent to which areas were exposed to power outages.

We study the Colombian context where power rationing was in place from February 1992 to March 1993. This power rationing was caused by insufficient rainfalls due to the El Nino phenomenon. This lead to low water levels in the reservoirs of hydroelectric dams and resulted in significantly less power being generated. The blackout had some appealing features: because it was caused by an unforeseen climate change phenomenon, it was unexpected; it lasted for one year, long enough for sufficient statistical power to detect the impact on fertility and long run family size; and, since it affected the country, it was very clearly delimited in time and space.

We exploit luminosity data to map the geographic heterogeneity of the extent to which there was indeed a black-out. There are a lot of reasons why, there was heterogeneity in the extent of power rationing. One source of heterogeneity is the geographic distance to the nearest power generating facility. Transmission of electricity generates natural gradients due to losses in power along the way. Further, some parts of the country were less exposed due to existing alternatives for power generation (such as geothermal power generated mainly in the North of Colombia). Third, the power network was not fully integrated. There were several regional grids owned by different network operators and cross-border connections to Venezuela or Peru did not exist. Another reason for heterogeneity may be a political economy channel - namely, municipalities that were well-connected to the ruling party, may have been able to lobby for less extensive rationing in their municipality. All of these points suggest that the effect of power rationing was indeed heterogeneous. Figure 2.3.1 highlights our approach to measure this heterogeneity indirectly, using night-lights luminosity data available from US run Defense Metrological Satellite Program (DMSP).

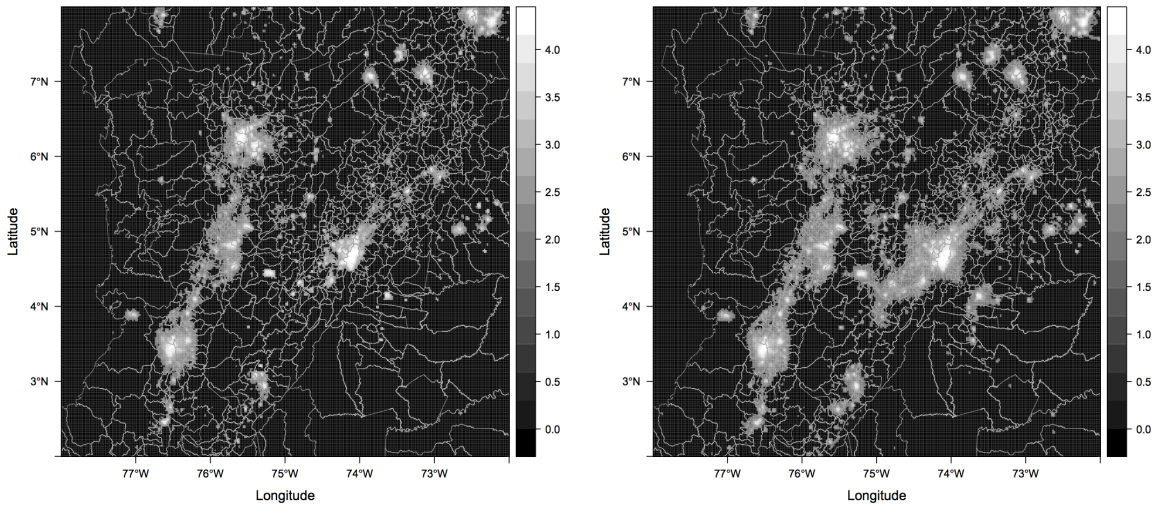


Figure 2.3.1: Light intensity in Colombia, 1992 (left) and 1993 (right) on identical log-scales along with municipality borders.

The figures depict the luminosity variable around three main urban centers in Colombia in 1992 (left) and 1993 (right). The northern area is the Medellin metropolitan area, while in the south is Colombia's second biggest city Cali. The light-blob to the right is the metropolitan area of Bogota. The differences in the pictures are dramatic. Especially around Bogota, the broader geographic area appeared to be completely dark in 1992, while it is lit in 1993.

Note that the nightlight data series is only available from 1992 onward. Hence, we can not compare the light intensity in the year 1992 (the year of the outage) with preceding years, as this data simply does not exist. However, we may be able to compare the 1992 lighting intensity with the intensity in 1993 or 1994. This measure will, of course, be subject to measurement error since the 1993 luminosity is an outcome variable in itself. However, as we are studying micro-level data, it is hard to believe that the micro mother-level variation we exploit has a direct effect on 1993 luminosity. In fact in appendix 2.B we also show the luminosity for 1994 - it is difficult to argue that the year-on-year variation between 1992 and 1993 is capturing something other than the power-outage, since the pictures for 1993 and 1994 look almost identical.

We construct the power outage intensity variable at municipality level as being essentially the ratio of the average population-weighted municipality luminosity in 1992 over that measure for 1993, i.e. it is constructed as:

$$O_m = 100 \times \left(1 - \frac{Lights_{1992}}{Lights_{1993}}\right)$$

The weighting by population becomes necessary as the IPUMS data merges several municipalities that have population sizes less than 20,000 to ensure that users of the data are not able to reverse-engineer who the individuals in the sample were.

This makes the treatment intensity construction more tedious and less clean, but does not represent a significant issue. In total we are left with 515 municipalities that have population above 20,000.[11] The average measure suggests an outage extent of around 30%. Total luminosity was 30% lower in 1992 compared to 1993. This maps well into the estimates from Tebsa, a big power generator at the time, who estimate that the shortfall was around 20% relative to the annual production in 1991.[12]

Before turning to the empirical specification and the main results, we discuss the census data that is used throughout the chapter.

2.3.2 Census Data

An analysis that studies fertility effects at the aggregate level may fail to discover any statistical effect due to low power conjoint with small effect sizes; in addition, there may be compositional effects as the cohorts of women who have babies in a municipality changes over time. In order to address this, we construct individual level birth histories using the 2005 micro sample census of Colombia provided by IPUMS. The micro-data sample covers 10% of the population at the time and was hailed to be the most successfully conducted population census.[13] For the short run outcomes, we construct a retrospective panel of mothers using the matched mother to children data for the period 1990 to 1995. We restrict our analysis to mothers aged between 18 and 45 in 1993. This ensures that no woman was younger than 15 years old in 1990, the earliest year of analysis in our sample. The panel structure of the data allows us to identify the effect of the blackout by exploiting within-mother variation in the timing of birth of babies, instead of cross-region or within-region variation. This gives us a total number of 624,667 mothers with 369,140 number of children born in this period. We restrict the short run analysis to a tight 6 year window, given the dynamic nature of changes in fertility both over time and space. Due the exogenous timing of the shock, focusing on the years immediately before and after the blackout allows us to mitigate some of the concerns related to parallel trends across the different municipalities, which would be needed to study fertility dynamics over a longer horizon.

For the long run analysis, we exploit the exogenous timing of the blackout caused by El-Nino rainfall shortages and take advantage of the timing of births, giving us a quasi-random experiment where mothers were not treated by the blackout due to biological constraints. We restrict our analysis to comparing women who gave birth in 1993 to women who gave birth in 1992 and 1991. Further, we only consider women who have fewer than 8 children. The reason to focus on this group

[11] Our results are robust to weighting by the geographic size of municipalities. Note that the measure may actually take on negative values, indicating that there are places that were more luminous in 1992 then in 1993; however, the bulk of the municipalities exhibit a positive measure.

[12] See `http://www.tebsa.com.co/history.htm`, accessed on 20.06.2013.

[13] See `http://unstats.un.org/unsd/censuskb20/KnowledgebaseArticle10236.aspx`, accessed 20.06.2013.

of women is driven by the fact that a non trivial number of mothers report having more than 7 children. This is approximately 10% of the sample of women who gave birth in 1991/1992/1993. It is very likely that a woman that has 12 children is very different than a woman that has total number of children closer to the sample mean of 4. Thus we restrict the sample to this sub-population as it allows us to identify the impact of an unintended pregnancy on an average woman (especially with declining fertility rates over time). This leaves us with 55,457, 56,656 and 61,282 women in the sample for 1991, 1992 and 1993, respectively. The summary statistics for the key variables in the short and long-run are presented in Appendix 2.A.

We now proceed to detail the empirical strategy and present the main results.

2.4 Empirical Strategy

We separate the empirical analysis into three steps. First, we look at the short run implications of the power outages on mother-level fertility behavior. Secondly, we show that these effects persisted - i.e. that the power outage is associated with a life-time increase in fertility. In the third section we ask how this long-run effect correlates with economic outcomes for the mothers, thus highlighting the possibility of there being welfare consequences.

2.4.1 Short Run Fertility Effects

Our dependent variable is a dummy variable $B_{imt} = 1$, if mother i from municipality m gave birth in year t. We estimate the following linear probability model specification

$$B_{imt} = a_i + b_t + \gamma \times O_m \times T_t + \epsilon_{imt} \tag{2.7}$$

where we include mother fixed effects a_i and time fixed-effects b_t. We add the sub-index m for municipality, since the treatment intensity is fixed at municipality level. The treatment assignment is $T_t = 1$ for $t = 1993$, i.e. the year in which babies conceived in 1992 are being born.[14] Note that T_t is perfectly collinear with the time-fixed effects b_t and the power outage measure O_m is invariant at municipality level, thus perfectly collinear with the mother fixed effects a_i.

The coefficient of interest is γ, which measures the average difference in the probability of giving birth for a mother. The interaction term exploits variation across municipalities in the degree of power-outage intensity measured by O_m. The coefficient γ represents the causal effect of power-outage intensity on the probability of giving birth under the following assumption. After controlling for mother fixed effects and exogenous covariates, the changes in probability of birth for mothers living in municipalities which experienced lower power-outage treatment provide a

[14] It is clear that this is an Intention to Treat design, as we do not actually observe fertility and mating behavior around the time, i.e. we can not rule out that some women who were assigned treatment did actually receive treatment.

counterfactual for mothers living in municipalities which were hit by higher power-outage treatment.

Municipality unobserved characteristics could be a source of violation of the identifying assumption represented by model 2.7. However, unobservable time-invariant characteristics of municipalities such as geography, history and culture are not because the set of mother fixed effects in each municipality captures such municipality fixed effects. On the other hand, due to the short time frame we consider for the analysis (1990-1995), we are not very concerned about time-varying unobserved factors which may be correlated with the intensity of power-outage and probability of birth.[15]

2.4.2 Long-run Fertility Outcomes

The simple theoretical framework is a static one. However, a short-run fertility shock may be fully compensated by a reduction in fertility in the future. If this is the case, then we would not expect any persistent effect on fertility due to the power outage. In particular, we would not expect an effect on the total number of children in the lifetime of a women that was affected by the power outage, as increased fertility behavior during the blackout is compensated with less fertility in later years. Nevertheless, one may still find an effect of unexpected children on the mother's socio-economic outcomes.[16]

We first turn to studying whether women who experienced a fertility shock were adjusting their fertility behavior later on in life. The key difficulty for this exercise is to find an adequate treatment and control-group for which a difference-in-difference methodology can be applied on the cross-sectional data on the number of children per women that comes from the census. This is not straightforward as cohorts in different age-groups may be differing in many ways. Hence, it is difficult to verify a common trends assumption.

Selecting a good counterfactual cohort may help us address issues regarding the *underlying mechanisms*. In particular, it is possible that the power outage had a direct effect on incomes and through that affected long-run outcomes at the mother-level. This would lead to a violation of the exclusion restriction for our later instrumental variables exercise. A second concern is that the power-outage may have led women to become mothers at an earlier age. Since these women are sexually active for a longer period of time, we would expect them to have, in total, more children. It has been shown that early motherhood has been found to adversely affect the mother (see e.g. Ashcraft and Lang, 2006), which would lead to yet another violation of the exclusion restriction for our exercise.

We will choose our treatment and control group to get the closest possible definition to highlight the unplanned motherhood mechanism. In particular, we choose

[15] Another obvious concern is migration. We address this in the robustness checks and show that our results are robust to studying women who most likely did not migrate in their live up to 2005.

[16] Since in 2005, most of these children were only 12 years old, we are not yet able to study consequences on the "power outage babies" themselves. This is left to the next census round.

our control group such that both treatment and control were exposed to the power outage (and thus, a possible income shock), but only the treatment group could *physically receive the treatment*. To address the channel of early motherhood affecting socio-economic outcomes, we present results for a constrained sample of mothers both in the control and treatment group who had given birth at least once before 1992 and 1993, respectively.

With this in mind, we chose the control group as women who gave birth during 1992, the period in which the blackout occurred. These women were, if anything, only partially treated. It is clear that a women who gave birth in 1992 may have been affected by changing fertility behavior but could not physically conceive for the months she was pregnant during the blackout for obvious reasons. In addition, these women are biologically less likely to be responsive to treatment in form of changing fertility behavior. Post-delivery, the likelihood of having another child immediately is very low as post natal care takes up a large chunk of the mothers time. As per the sample, only 3.4 per cent of the women gave birth in both 1992 and 1993. Hence, women who gave birth in 1992 were exposed to the treatment in many ways but were physically constrained to be responsive to any changes in sexual behavior during the black out. Thus, they can constitute a control group for women who gave birth in 1993.

The treatment group is thus women who gave birth in 1993, while the control group is women who gave birth in 1992. As a placebo check we compare women who gave birth in 1992 to women who gave birth in 1991. [17]

This assignment of treatment and control group constitutes a very good counterfactual, as their age-profiles and hence their physiological fertility profiles are very similar since they reproduced around the same period of time. Furthermore, the choice of treatment and control group helps us rule out alternative mechanisms that could violate our instrumental variables identification strategy for the effects of unplanned motherhood on socio-economic outcomes of the mother.

The specification we estimate is a difference in difference specification. This allows us to test the impact of the blackout on total number of children 12 years onwards, comparing women who gave birth in 1993 to women who gave birth in 1992.

In particular, we estimate:

$$tch_{ami} = b_{ma} + \beta_1 T_i + \beta_2 O_m + \beta_3 T_i \times O_m + \mathbf{X_{im}}'\pi + \epsilon_{ami} \tag{2.8}$$

where tch_{ami} is the total number of children born to mother i in municipality m in a ten year age cohort a. The variable b_{ma} is a set of municipality-age-fixed effects. These control for common shocks to women of the same age in a municipality. These fixed-effects are very demanding, but take out a lot of age specific heterogeneity

[17] Since the treatment was for a year, while pregnancy lasts for only 9 months, it is possible for a mother to have given birth twice in two years. Our first stage is robust to the exclusion of mothers who gave birth in both years. A balance check is presented in Table 2.A.3. Not conditioning for the control variables we include in the regression, the treatment and control groups compare quite well.

that could be due to age or time-specific events at municipality level. Note that in this setup, we can not control for mother-fixed effects, as there is only cross-sectional variation in the dependent variable. The variable O_m measures, as before, the intensity of the power outage in 1992. Treatment is assigned to mothers i in municipality m that gave birth in 1993, while this variable is set to zero for mothers in municipality m who gave birth in 1992. $\mathbf{X_{im}}$ contains other time-invariant controls fixed at the mother level.[18]

2.4.3 Long Run Impacts on the Mother

We can now turn to the third pillar of the analysis. Namely, we want to shed light into whether the persistent part of the fertility shock had some long-lasting effects on the lives of the mother or the family environment in which the mothers live. In order to do this, we exploit the variation in nightlights as an instrument for the total number of children, allowing us to shed light on the impact of unplanned babies on the life-path of mothers and the family in which children are brought up. It is important to highlight that this design only captures the differential effect of increased total lifetime fertility due to the power outage and does not capture any effects that may be due to an unplanned child that did not result in an increase in lifetime fertility. Even though our treatment effect is on a very specific subset of women, nevertheless, we think this is an important contribution to the existing labor economics literature, which has highlighted the role of the family environment for long-term outcomes of household members.

As a preview of the forthcoming results, we first establish that the power outage had persistent effects on the total number of children born to a mother i. Next we use this variation to explore other margins through which a mother i was affected through having a "power outage baby". We proceed with an IV estimation whereby we exploit the arguably exogenous variation in power-outage intensity that resulted in more babies being born. These additional children may affect women, as they may have to give up e.g. further education. They also may have had to enter the workforce at a younger age, which allowed them to build up assets earlier, even though their lifetime earnings prospects may be significantly lower.

The relevance of our instrument is ensured by the persistent effects of the power outage on longrun total number of children. The exclusion restriction requires that there is no other channel through which the exposure to the power outage intensity O_m had an effect on some outcome y_{mai} for a women i of age cohort a living in municipality m. We explore some falsification exercises that suggest that the excludability of the instrument is indeed satisfied. The first stage for our Instrumental Variable specification is simply specification 2.8 from the previous section. We use the first-stage to generate fitted values for the total number of children and then

[18]These include an indicator variable for the ethnicity status (mainly to control for indigenous populations) at the mother-level and some indicator of whether the location of the mother within the municipality is a population center, a head-town or dispersed population.

estimate:

$$y_{mai} = b_{ma} + \theta \times \hat{tch}_{mai} + \eta_1 T_i + \eta_2 O_m + \mathbf{X}'_{\mathbf{im}} \times \mathfrak{B} + \nu_{ami} \tag{2.9}$$

The coefficient θ measures the rate at which a mothers' socio-economic outcomes change for an additional child that was born due to the power outage. Since we only capture variation in total fertility for the women who did not dynamically adjust their fertility in the years after the power outage, this is a specific local average treatment effect. The socio-economic outcomes we study at the mother level from 2005 are: ownership of accommodation, quality of accommodation, whether they are single mothers, whether they are self-employed or graduated from university.

We now present the key results from each of the tree steps of the analysis.

2.5 Results

2.5.1 Short Term Fertility Effect

The first set of results pertains to the short term fertility increases due to the power outages. These are presented in Table 2.1. The estimated coefficients on the interaction term between power outage intensity and treatment are positive and significantly different from zero. In column (2) we add time fixed effects, in column (3) we add municipality fixed effects and in column (4) we replace municipality fixed effects with mother fixed effects. At first, it may seem surprising that the coefficient remains very stable and does not change when adding the mother fixed effects. However, we may see this exercise as evidence that the treatment was quasi random, as adding the fixed effects does not change the estimated coefficient, which is what we would expect if treatment was quasi random. In column (5) we add a control for economic development as measured by the log of lights in municipality m [19]. Finally we control for department trends in column (6). Even in the most demanding specification, our estimate remains stable and precisely measured. A 100% increase in power-outage intensity (i.e. complete blackout relative to previous year) increases the probability of having a birth by approximately 0.005 percentage points. A 0.005 percentage point increase is an increase of 5% in the probability of giving a birth in a given year when evaluated at the mean probability of giving birth. At the mean power-outage intensity of 32%, we estimate the additional number of children born due to the power-outage to be 9,994.[20] How does this compare to the total expected number of children being born in this period? Given a mean probability of

[19] We use the mean lights to control for economic development as a time varying control. For years prior to 1992, we replace the light measure with the 1992 data as the satellite images are only available from 1992 onwards. Under the assumption that in the very short run, spatial development is time invariant, the 1992 light measure should be a good proxy for 1990 and 1991.

[20] We arrive at the figure by scaling up the point estimate by 10 and then multiplying it by the mean black-out intensity of 0.32, by the number of women in the estimation sample. This implies, given our point estimate of 0.005, that there are $0.005 \times 0.32 \times 624,667 \times 10 = 9,994$. We multiply by 10, since the census micro-data pertains to only 10% of the population.

giving birth of 9.9%, on average, 624,667 babies would have been born. Hence, we can estimate that 1.6% of the babies born were "power outage babies". Column (7) presents evidence on heterogeneous treatment effect. There is strong support for differential cohort effects. Most of the impact of the power-outage is being driven by the younger cohort who were aged between 18 and 33 in 1993. The effect on the older cohort is positive but marginally insignificant, possibly indicating that these women are less likely to be biologically responsive to the shock. The results indicate that the effect-sizes are relatively small, which may explain why demographers have failed to find evidence using aggregated data (see Udry, 1970).

We consider a few robustness checks to ensure the validity of our results. Column (1) of table 2.2 presents the preferred specification from table 2.1. Since the census sample was conducted in 2005, a major concern with our results is that mothers may have moved across municipalities since 1993, thus biasing our power-outage intensity assignment. If this is due to pure randomness, we would expect our measure to be noise and thus lead to attenuation bias. On the other hand if the re-location choice of the mother is correlated with some unobserved characteristic of the municipality in 1993, we would have biased estimates for the effect of power-outage on probability of birth. In order to address this, we restrict our sample to women who are born in the same municipality and have lived there all their lives. In column (2), we present the results of the sub sample and re-assuring, our point estimate remains stable. In column (3) we carry out a placebo test by re-assigning the treatment year to be 1992, reflecting children born who were conceived in 1991. Since 1991 was a normal year with respect to electricity provision, we would not expect any differential impact of power-outage intensity for children born in 1992. Indeed we find a smaller and statistically insignificant coefficient. In column (4) we use a different measure of the power-outage intensity and find that the point estimate for γ remains robust to the alternative measure of power-outage intensity [21]. In column (5), we control for log luminosity [22] to account for any economic development that maybe correlated with our measure of power outage. Our measure of power outage still predicts fertility, Columns (6) and (7) explore some asset ownership interactions; as these are measured in 2005, they are likely endogenous and it becomes clear that no pattern emerges.

We now turn to the study of the persistent effects of the power outage on total fertility.

[21] The alternative measure is constructed by using the share of pixels that were lit in a given municipality rather than the mean value of lit pixels. This measure tries to control for measurement error in the average lights by just assigning a value equal to 1 if a pixel had any positive light and 0 otherwise. The construction of the outage intensity is done exactly in the same way by comparing total lit pixels in 1993 to total lit pixels in 1992.

[22] log luminosity is measured as the log of total number of lit pixels in the municipality.

2.5.2 Incomplete Adjustment of Fertility Effect

The temporary fertility effect demonstrated in the previous section may be dynamically offset by having fewer children in the future. In this section we document that this is not the case. We study a cross section of total births for women in 2005. The results from this analysis are presented in table 2.3.

Column (1) is a simple difference in difference regression without any controls. The coefficient on the interaction term is positive and highly significant. This means that the mothers who gave birth due to the power outage were unable to fully compensate by having fewer future children relative to mothers who gave birth just a year prior to the power outage. In columns (2) and (3), we add municipality age fixed effects and mother level controls respectively. Column (3) suggests that if a municipality was exposed to 100% blackout in 1993, then approximately every 10th mother in the treatment group within the municipality is likely to have one more child compared to the control group. Thus, out of the 9,994 power outages babies estimated in the previous section, approximately a 1000 babies were not fully adjusted for 12 years on. Evaluating at the mean power-outage intensity, we obtain an upper bound of 1,961 additional number of children 12 years later[23]. Column (4) and (5) report some robustness checks to ensure our results are indeed meaningful and do not simply capture differential trends between the cohorts. In column (4) we present a placebo check. We perform the same exercise comparing women who gave birth in 1992 to women who gave birth in 1991. Since there were no power outages in either of the two years, there is no reason to believe that the blackout should have any significant impact on the long run total number of children for these two groups of women. Indeed the difference in difference estimator is close to 0 and insignificant. In column (5) we look at the long run outcome by age groups. The heterogeneous treatment effect gives us a natural placebo, since younger cohorts have more time to adjust their fertility behavior, we would expect the impact to be smaller for them. Indeed, majority of the long run effect observed is being driven by the older cohort who potentially were not able to adjust their lifetime fertility post the black out. The coefficient for the younger cohort is smaller and positive, but marginally insignificant, indicating that there may still be younger women who have not been able to fully adjust to the unanticipated fertility shock.[24]

It becomes evident that the power outage had a significant effect on the number of children born for the treated cohort. This suggests that there is incomplete adjustment and an increase in total fertility. We can not say much about why total fertility has increased, especially for the cohorts that could feasibly adjust. However, we can use these results one step further to answer the question on what are the impacts on the mother who had an unplanned child and was constrained in adjusting total fertility?

[23]We arrive at this estimate by multiplying the estimated coefficient of 0.1 by the 61,282 mothers who had a child in 1993 by the mean outage intensity of 0.32

[24]Since total number of children is a count variable, we present the same specification using a Poisson model. The results remain robust to the Poisson model and are presented in Appendix 2.C

2.5.3 Long Term Effects on Mothers' Socioeconomic Outcomes

Bringing up a child is costly as it requires time spent away from working or obtaining a degree. In addition, women who had an unplanned child may find themselves in more unstable relationships. We study these questions using the increase in total fertility due to the power outage as a natural experiment for an instrumental variables design to estimate the local average effect of having an unplanned child. The results from this exercise are presented in table 2.4.

Column (1) presents the preferred first stage specification. In columns (2) and (3), we see that they were more likely to own the accommodation they live in, but this accommodation tends to be of lower quality. The quality of the accommodation is an index that takes a maximum value of four if the accommodation has dirt-floors, no solid walls, use of wood fuel and no access to running water.

In column (4) we find that women who were subject to the power-outage induced fertility shock were more likely to be single-mothers in 2005, possibly reflecting the social cost of having unwanted babies. We do not find any effect of an extra child on the likelihood of self employment, see column (5). However, they are less likely to have graduated from university, see column (6). The last column serves as a placebo check. Here we see whether the total number of children had an effect on the mother's primary school educational attainment. As this was predetermined before the mother was in child-bearing age, it is reassuring that the total number of children appear not to have an effect on this outcome. It is important to highlight that the IV strategy provides some distinct results, compared to the simple OLS estimation of the above specifications.

Finally in table 2.5, we repeat the above exercise, but for the constrained sample of women who are not first time mothers. Column (1) presents the first stage results, which remain significant but become less precise. The IV estimates remain qualitatively similar to including all women in the sample, however they lose precision due to the reduction in sample and a weaker first stage.

These results taken together paint a very interesting picture. It suggests that there were persistent effects on women, who had more children in total due to the power outage. These women are living in less stable family situations, as they are more likely to be single mothers. One potential explanation could be because the child was not planned. There are also repercussions on the educational attainment, with women not taking higher education. However: there are also some more positive results. Women may have had to enter the labor force at a younger age due to having a baby. This makes it more likely that these women can accumulate assets and own the house in which they live.

From the perspective of a social planner however, the unplanned parenthood is likely to entail social costs that are further evolving dynamically. The worse living conditions of mothers may translate dynamically into lower levels of educational attainment for the children, as they may not be able to finance an education for the children. In addition, if population growth is a concern to planners, the overall

increase in total fertility due to the power outage is a first order concern.

2.6 Conclusion

This chapter set out to analyze the impact of vast power rationing in Colombia in the early 1990's on fertility behavior. This is the first attempt to evaluate the impact of power rationing on population dynamics, going beyond the question whether power outages may cause "mini baby booms".

Such research was not possible, because we lacked good data on electricity consumption. However, we highlight that the satellite based night-lights measures maybe used to identify places which were subject to power rationing and periods of blackout.

We use this measure to show that women who live in areas in which the power rationing was more severe, were more likely to give birth in the year following the rationing period. This suggests that there are indeed "mini baby booms". However, we take these results further to answer the question whether fertility behavior dynamically adjusts over time.

We find that there is persistence, as women do not fully adjust their overall fertility. Finally, we show that the power-outage induced baby boom had long run consequences for the mothers. This suggests that there are significant "hidden cost" to variable or low quality infrastructure.

In order to equip policy makers in developing countries that face periods of severe power rationing, further research needs to be carried out to understand the timing of load shedding and its effect on fertility, so as to minimize the hidden social cost of blackouts.

Table 2.1: The Impact of Power Outage Intensity on Birth Probability

	Different Fixed Effects						Age Specific
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Outage Intensity x Treated	0.475***	0.475***	0.475***	0.475***	0.475***	0.457***	
	(0.149)	(0.149)	(0.149)	(0.163)	(0.163)	(0.164)	
Outage Intensity x Treated x Younger than 30							0.650**
							(0.266)
Outage Intensity x Treated x Older than 30							0.290
							(0.201)
Mother FE	No	No	No	Yes	Yes	Yes	Yes
Time FE	No	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	No	No	Yes	.	.	.	.
Department Trends	No	No	No	No	No	Yes	No
Mean Birth Probability	.0985	.0985	.0985	.0985	.0985	.0985	.0985
Observations	3748002	3748002	3748002	3748002	3748002	3748002	3748002
Number of Groups	515	515	515	515	515	515	515

Notes: Significance levels are indicated as * 0.10 ** 0.05 *** 0.01. Standard errors in the parentheses are clustered at the municipality level. Outage x Intensity measures the proportional change in municipality-level luminosity between 1992 and 1993. The dependent variable is an indicator variable equal to one, in case the mother experiences a birth in a given year. Note that the municipality fixed effects are perfectly collinear with the mother fixed effects in specifications (4) - (6). The coefficients are multiplied by 100.

Table 2.2: Robustness of the Short-Run Fertility Effect of Power Outages

	Robustness to Measures and Specification					Heterogeneity	
	(1) Baseline	(2) Non-movers	(3) Placebo	(4) Lit Pixels	(5) Total Luminosity	(6) Electricity	(7) Assets
Outage Intensity x Treated	0.475***	0.437**	0.257	0.302***	0.512***	0.185	0.411
	(0.163)	(0.198)	(0.191)	(0.105)	(0.196)	(0.548)	(0.284)
Outage Intensity x Treated x Electricity						0.312	
						(0.587)	
Outage Intensity x Treated x Assets							-0.003
							(0.125)
log(Luminosity)					-0.001		
					(0.001)		
Mother FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean Birth Probability	.0985	.103	.0985	.0986	.0977	.0985	.0985
Observations	3748002	2163630	3748002	3660234	3645339	3748002	3748002
Number of Groups	515	515	515	502	508	515	515

Notes: Significance levels are indicated as * 0.10 ** 0.05 *** 0.01. Standard errors in the parentheses are clustered at the municipality level. Outage x Intensity measures the proportional change in municipality-level luminosity between 1992 and 1993. Column (2) restricts the analysis to mothers whose location of birth is the same as the present location. Column (3) moves the treatment one year earlier. Column (4) uses a different measure of the outage as being simply the change in the share of lit pixels between 1992 and 1993. Column (5) controls for total luminosity in a municipality. The coefficients are multiplied by 100.

Table 2.3: The Persistent Effects of Power Outage Intensity on Total Number of Children

	Different Controls			Placebo	
	(1)	(2)	(3)	(4)	(5)
Outage Intensity x Treated	0.088***	0.093***	0.094***	-0.043	
	(0.033)	(0.031)	(0.030)	(0.036)	
Outage Intensity x Treated x Older than 30					0.109**
					(0.043)
Outage Intensity x Treated x Younger than 30					0.041
					(0.026)
Outage Intensity	0.464***				
	(0.085)				
Muncipality x Age FE	No	Yes	Yes	Yes	Yes
Mother Controlls	No	No	Yes	No	Yes
Mean Number of Children	3.55	3.55	3.54	3.55	3.54
Observations	103676	103676	101044	98499	103337

Notes: Significance levels are indicated as * 0.10 ** 0.05 *** 0.01. Standard errors in the parentheses are clustered at the municipality level. Outage x Intensity measures the proportional change in municipality-level luminosity between 1992 and 1993. Treated women are women who gave birth in 1993 while control group women are women who gave birth in 1992. The dependent variable is the total number of children born up to 2005. Column (4) is a placebo where we assign treatment to women who gave birth in 1992 and control group to women who gave birth in 1991. Column (5) shows that the persistence is mainly driven by women who cannot physically adjust their long term fertility anymore due to their age. Mother controls include an indicator variable for the ethnicity status (mainly to control for indigenous populations) and some indicator of whether the location of the mother within the municipality is in a population center, a head-town or considered to be dispersed population.

Table 2.4: The Persistent Effects of Power Outage Intensity on Socio-Economic Status of the Mother

	(1) First Stage	(2) House	(3) Low Quality House	(4) Single Mom	(5) Self-employed	(6) University	(7) Placebo
Outage Intensity x Treat	0.093***						
	(0.031)						
Instrumental Variables							
Total Children Born		0.280**	0.479**	0.163*	0.496	-0.119**	-0.125
		(0.128)	(0.216)	(0.093)	(0.472)	(0.059)	(0.112)
Ordinary Least Squares:							
Total Children Born		-0.009***	0.098***	-0.000	0.004**	-0.022***	-0.079***
		(0.002)	(0.005)	(0.001)	(0.002)	(0.002)	(0.001)
Reduced Form:							
Outage Intensity x Treat		0.027***	0.046**	0.016**	0.039**	-0.010**	-0.011
		(0.010)	(0.018)	(0.007)	(0.018)	(0.004)	(0.010)
Municipality x Age Group FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean of Dependent Variable	3.55	.603	.789	.129	.22	.0514	.638
Observations	103676	102721	102287	103358	30521	102800	102800

Notes: Significance levels are indicated as * 0.10 ** 0.05 *** 0.01. Standard errors in the parentheses are clustered at the municipality level. Treatment indicates mothers who gave birth in 1993, while control group constitutes of women who gave birth in 1992. Outage Intensity measures the proportional change in municipality-level luminosity between 1992 and 1993. The table presents the IV, OLS and the Reduced Form results in separate rows. The dependent variable is given in the column head and are various socio-economic variables of the mother measured in 2005. Column (1) is the first stage. Column (2) studies whether a mother owns the house in which she lives. Column (3) is an index for housing quality. Column (4) is an indicator whether the mother is a single mom. Column (5) studies an indicator whether the mother is self-employed, while column (6) studies whether the mother has some university education. Column (7) is a placebo test where the left hand side is a dummy indicating primary school completion, which is predetermined in the treatment year.

Table 2.5: The Persistent Effects of Power Outage Intensity on Socio-Economic Status of the Mother : Robustness to Not First Birth

	(1) First Stage	(2) House	(3) Low Quality House	(4) Single Mom	(5) Self-employed	(6) University	(7) Placebo
Outage Intensity x Treat	0.118***						
	(0.045)						
Instrumental Variables							
Total Children Born		0.227	0.354	0.092	0.048	-0.093*	-0.221
		(0.153)	(0.243)	(0.086)	(0.196)	(0.055)	(0.136)
Ordinary Least Squares:							
Total Children Born		-0.009***	0.099***	0.001	-0.001	-0.017***	-0.080***
		(0.002)	(0.005)	(0.001)	(0.003)	(0.002)	(0.002)
Reduced Form:							
Outage Intensity x Treat		0.025*	0.039	0.011	0.008	-0.010*	-0.023*
		(0.015)	(0.025)	(0.009)	(0.032)	(0.005)	(0.014)
Municipality x Age Group FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean of Dependent Variable	4.08	.635	.882	.126	.235	.0364	.58
Observations	57332	56811	56584	57020	15172	56637	56637

Notes: Significance levels are indicated as * 0.10 ** 0.05 *** 0.01. Standard errors in the parentheses are clustered at the municipality level. Treatment indicates mothers who gave birth in 1993 and had already given birth at least once before 1993, while control group constitutes of women who gave birth in 1992 and have given birth at least once before 1992. The sample is restricted to those mothers whose birth in 1993 was not their first birth. Intensity measures the proportional change in municipality-level luminosity between 1992 and 1993. The dependent variable is given in the column head and are various socio-economic variables of the mother measured in 2005. The left hand sides for column (2) - (6) are given in the column heads. Column (1) is the first stage, while column (7) is a placebo test where the left hand side is a dummy indicating primary school completion, which is predetermined in the treatment year.

2.A Appendix: Summary Statistics

Table 2.A.1: Summay Statistics for Short Run Analysis

Variable	Mean	Std. Dev.	Min.	Max.	N
Birth (dummy)	0.1	0.3	0	1	3748002
Outage Intensity	0.29	0.26	-0.38	1	3748002
Outage Intensity (lit pixel share)	0.32	0.38	-2.03	1	3690818
TV ownership (dummy)	0.72	0.45	0	1	3574890
Electricity (dummy)	0.92	0.27	0	1	3748002
Refrigerator (dummy)	0.63	0.48	0	1	3591732
Total Number of Assets Owned	2.02	1.62	0	6	3748128
Aged between 18 and 29 in 1993	0.51	0.5	0	1	3748128

Source: 2005 micro sample census of Colombia.

Table 2.A.2: Summary Statistics for Long Run Analysis

Variable	Mean	Std. Dev.	Min.	Max.	N
Outage Intensity	0.32	0.27	-0.38	1	162526
Indigenous (dummy)	0.17	0.37	0	1	161350
Mother's age	40.8	6.33	31	58	162526
Age in 1992	27.8	6.33	18	45	162526
Total Children Born	4.08	2.38	1	24	159023
House Ownership (dummy)	0.62	0.49	0	1	160215
Cheap Housing	0.87	1.13	0	4	159458
Single Mom (dummy)	0.13	0.33	0	1	162024
Self Employed (dummy)	0.23	0.42	0	1	45801
University Degree (dummy)	0.05	0.21	0	1	160034
Primary School Completion (dummy)	0.59	0.49	0	1	160034

Source: 2005 micro sample census of Colombia.

Table 2.A.3: Summary Statistics: Comparison Between Control and Treatment Group for Long Run Analysis

	Control		Treatment		P-val
Variables	N	Mean	N	Mean	
Outage Intensity	56656	0.320	61282	0.324	0.015
Indigenous (dummy)	56265	0.173	60816	0.174	0.558
Mother's Age	56656	40.791	61282	39.997	0.000
Mother's Age in 1993	56656	27.791	61282	26.997	0.000
Total Children Born	55436	4.140	59981	4.148	0.599
House Ownership (dummy)	55810	0.623	60618	0.610	0.000
Cheap Housing (dummy)	55533	0.896	60302	0.915	0.005
Single Mom (dummy)	56455	0.126	61116	0.125	0.641
Self Employed (dummy)	15822	0.225	16808	0.223	0.803
University Degree (dummy)	55777	0.046	60305	0.047	0.439
Primary School Completion (dummy)	55777	0.589	60305	0.590	0.682

Source: 2005 micro sample census of Colombia. P-value is the significance level of a t-test comparing the means of the respective variables in each row between the treatment and control groups.

2.B Appendix: Luminosity for 1994

As mentioned in the text, we lack luminosity data for the period before 1991, which would be the adequate control year for the construction of the power-outage intensity. However, the night light data is only available from 1992 onwards. That's why we had to compare the 1992 luminosity to the 1993 luminosity to construct the outage intensity variable. The following graphs depict the luminosity also for the year 1994 on the same scale. This highlights that the changes in luminosity from 1992 to 1993 is far from any "normal" year on year variation in luminosity, suggesting that we are really capturing the effect of the power outage through that variable correctly.

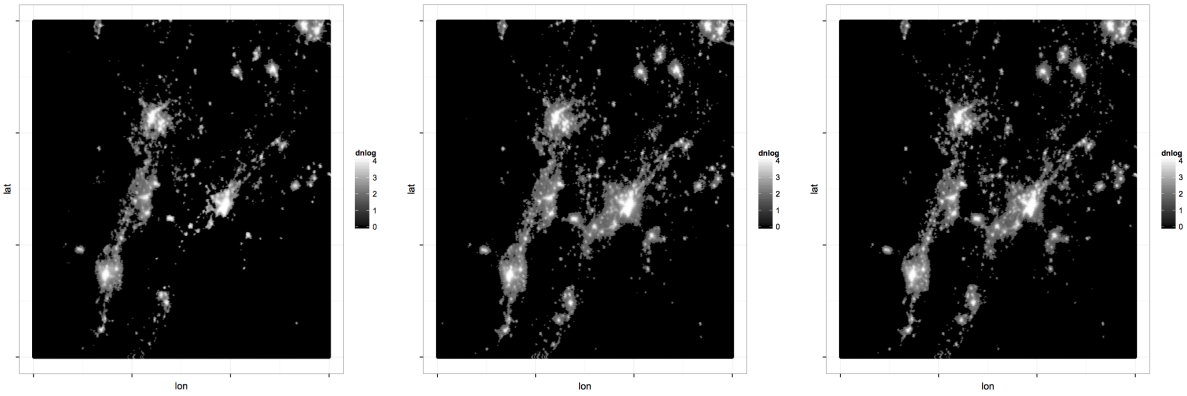


Figure 2.B.1: Light Intensity in Central Colombia, 1992 (left), 1993 (center) and 1994 (right)

2.C Appendix: Further Tables, Results and Robustness Checks

Table 2.C.1: Robustness of Total Fertility Effect to using a Poisson Model

	Different Controls			Placebo	
	(1)	(2)	(3)	(4)	(5)
Outage Intensity x Treated	0.024***	0.024***	0.023***	-0.011	
	(0.009)	(0.008)	(0.008)	(0.010)	
Outage Intensity x Treated x Older than 30					0.027**
					(0.011)
Outage Intensity x Treated x Younger than 30					0.011
					(0.007)
Outage Intensity	0.129***				
	(0.024)				
Muncipality x Age FE	No	Yes	Yes	Yes	Yes
Mother Controlls	No	No	Yes	No	Yes
Mean Number of Children	3.55	3.55	3.54	3.55	3.54
Observations	103676	103643	101012	98478	103304

Notes: Significance levels are indicated as * 0.10 ** 0.05 *** 0.01. Regressions for a conditional fixed effect Poisson model. Standard errors in the parentheses are clustered at the municipality level. Outage x Intensity measures the proportional change in municipality-level luminosity between 1992 and 1993. The dependent variable is given in the column head.

Chapter 3

"American Idol" - 65 Years of Admiration

Almost every December since 1948, Gallup has conducted an opinion poll in which it asks an open-ended question "what man/woman that you have heard or read about, living in any part of the world, do you admire most?" The result usually forms the basis for a few news articles at the end of the year[1] . But the winner is very rarely a surprise - the male competition is almost always won by the US president and the female competition has been won by Hilary Rodham Clinton for 15 of the past 17 years and before her was mostly won by foreign female political leaders or the wife of the President or an ex-President. Table 3.1 gives the list of winners. But what is more interesting is that the winning share of the vote varies considerably over time and is often low - for example, in 2013 Barack Obama won with 15% of the vote and Hilary Rodham Clinton with 16% - so that most votes are going to someone other than the winner.

This chapter analyses responses to the 'most admired' question for the period 1948-2013 focusing not on the specific individuals who are named but on the type of individuals e.g. whether they are politicians, celebrities, businessmen or family/friends. There are a number of reasons why this exercise is interesting. First, the description of the way in which the responses have changed can tell us something interesting about the way social attitudes have been evolving over 65 years. Arguably this is the longest run of data on social attitudes on a consistent basis that exists. Second, we argue that there is a robust correlation between admiration and trust. Specifically, a correlation between admiring the president and trust in government[2]. Using this link we can provide evidence on trends in trust from the late 1940s, at least a decade earlier than is available from other sources. Third we investigate the link between admiration and media coverage showing there is a robust

[1] A summary of the winners and the most recent years' results can be found at http://www.gallup.com/poll/1678/most-admired-man-woman.aspx. There are also some spin-offs from this survey e.g. Yougov's survey of most admired in many countries of the world http://yougov.co.uk/news/2014/01/11/infographic-bill-gates-most-admired-world/

[2] It is true that the level of trust in the US congress is very low, however the time series data for trust in federal government and congress track each other surprisingly well.

positive correlation between being admired and newspaper coverage.

The chapter is structured in the following way. In the next section we describe the data and the way we categorize it. The second section documents the type of people who are admired and the trends in the types over the 60-year period. The most common type of response is current or former presidents or vice/presidents, followed by those who respond, "don't know/ no one" each receiving about a quarter of votes over the whole period. Other politicians and religious leaders each get about 10%, family and friends about 5% with the rest of the votes quite widely spread. Only a small number of respondents name someone from the world of business, entertainment or sports. In terms of trends, there is a remarkable similarity between the pattern of responses today and in the early 1950s suggesting that not much has changed. But there were large changes in the intervening period - the share of votes for the president/vice-president fall (e.g. Bill Clinton won in 2000 with 7% of the vote) before recovering with the categories of don't know/ no one and other politicians rising and then falling.

While these trends are perhaps interesting in their own right, their significance is less clear. The third section summarizes the disparate literature on the nature and purpose of 'admiration', arguing that admiration reflects a good opinion of the person admired, telling us something about the types of people and actions that are thought of as praise-worthy. This suggests that we think of the nature of the responses to the 'most admired' question as a form of social capital, specifically an indicator of trust. If, for example, one says one admires the president this might suggest one trusts the government. And if one admires no one then perhaps one is less likely to trust others.

The fourth section of the chapter explores these hypotheses using a number of data sets. We use the Civic Culture data set from Almond and Verba (1963) (the only data we have been able to find containing questions on both admiration and trust) to show the links between admiring different types of people and trust, providing support for the hypothesis of a link between admiration and trust. In addition, using the General Social Survey (GSS) and the American National Election Study (ANES) we show how the characteristics that predict answers to questions on trust also predict answers to the admiration question. In particular we find that those who report that they admire the president are more likely to trust the government and those who admire no one are less likely to trust others.

The relationship between admiration of the president and trust in government also holds in the time series as well as the cross-section i.e. the year-to-year variation in the admiration of president/vice-president tracks variation in trust in government. Using this link we can argue that trust in government was high from the late 1940s but rose further during the 1950s and perhaps peaked around 1960. The admiration data gives us 10 earlier years of data on trust in government before the ANES data starts. However, we do not find a strong correlation between the year-to-year variation in the propensity to report that one admires 'don't know/no-

one' and generalized distrust. We argue that this is partly the result of the way the Gallup survey responses are coded with 'don't know' and 'no-one' being only distinguished after 1977, and partly that responses to questions on generalized trust are quite variable (e.g. the ANES and GSS measures do not always show consistent trends).

The fifth section of the chapter investigates the connection between the media and admiration. We show there is a robust positive correlation between the number of votes received in the 'most admired' poll and the number of mentions in newspapers, even once one controls for person by year fixed effects and is using variation across states.

Our conclusion is that the 'most admired' data series allows us to investigate the way in which attitudes have changed over a very long period of time on a consistent basis, much longer than is common in studies of this type, so is a valuable resource for social scientists.

3.1 The 'Most Admired' Survey and Data

3.1.1 The 'Most Admired' Question

The main data used in this chapter comes from Gallup's most admired man and woman poll which has been conducted at the end of virtually every single year since 1948 and the individual data have been deposited in the Roper Centre (see, for example, Gallup, 2010). In the poll, Americans are asked, without prompting, to say what man and woman "living today in any part of the world, do they admire most?" Although the basic question has remained unchanged for 65 years, there have been some minor variations in the framing of the most admired question. Prior to 1960, respondents were asked to name the most admired man/woman, however after 1960, respondents were asked about both their most and second most admired man/woman. In 1999, the way in which the second most admired person was asked changed so that respondents were asked to name up to two most admired persons - the number of 2nd responses fell dramatically. In order to have the longest possible run of consistent data, our main analysis only uses first responses though results using second responses are very similar.

Further, in order to maintain consistency between polls over time, we restrict our analysis to years in which the question asked was the same to ensure no bias from framing of the question. Thus we drop data for 1969, 1976 and 1999 when the question asked varied significantly from the other years. We do not have any data for 1962, 1964, 1968, 1986, 1991 and 2006, as the survey was not carried out in those years. 1975 is another year, which is excluded as an abnormally large number of responses were coded as miscellaneous. Finally we drop the years 1960 and 1978, as the data dictionary was not coded properly. In total we use 54 out of the 66 years for analysis.

3.1.2 The Coding of Responses

Although the question is asked in an open-ended format and the response is not restricted in any way, the coding of those responses has varied somewhat over time so the individual data sets are not completely consistent over time. The way in which the coding has changed over time is best explained through the general types of responses.

First, there are those responses, which refer to what we might call 'public figures' that are people who generally would not know the respondent personally. The most common responses are always identified by name but the number of individuals so identified has varied over time with a maximum of 144 in 1952 and a minimum of 13 in 1990. In the earliest years the individuals with a small number of responses are recorded by type (e.g. religious leaders, businessmen) and there are some years in the 1950s where it appears that every public figure listed by a respondent is identified in the data set passed down to us. But in later years it is only the individuals with the largest number of votes who are identified by name and the rest are grouped into an 'other' category. In our main analysis we artificially limit the number of recorded public figures with rank less than or equal to 13 for men and 11 for women (these being the smallest number of names identified in any specific year) and assign all the rest to an 'unidentified' category. But the Appendix does show that our main conclusions seem robust to the problem that we cannot identify the type of person for those in the 'Unidentified' category.

The second big category of responses are those that refer to people who are not public figures but are known to and know the respondent - these can be grouped together as 'family and friends'. There has always been a category of this type.

The final category is those who either refuse to answer the question, who say that they don't know and those who respond 'no one'. In the earliest years the don't know/no one/refused are combined in a single code but after 1992 there is a separate code for refused. These two categories are not exactly the same, as one might know whom one admires but refuse to answer the question. But, in practice, the numbers refusing the question are very small - only 0.76

In most, but not all years, the responses 'don't know' and 'no one' are coded separately but there are some years where they are coded together (see Table 3.A.1 in the Appendix for details). These responses are not the same - 'no one' suggests some degree of thought has been given to the answer whereas 'don't know' perhaps suggests an absence of thought (though it is not clear that more thought would elicit a response). In most of our analysis we group these two responses together in order to have the longest run of data but there is some indication, discussed later, that the difference between 'no-one' and 'don't know' is significant.

Where we have a named person we classify them according to the type of person they are. Our categories are chosen on the basis of those that are most frequently mentioned though the bulk of votes are taken by a small number of categories. Our chosen categories are:

- Current or Past Presidents or Vice-Presidents (or their wives in the case of women)
- Other American Politicians
- Foreign Political Leaders
- Religious Leaders
- Celebrities (Media, Arts and Sports)
- Business Persons
- Academics and Experts

In addition, we have the 'don't know/no one' category, 'friends and family', and the 'unidentified'.

There are some ambiguities in classifying particular individuals and we try to use the appropriate category at the time they are mentioned. For example, Arnold Schwarzenegger is mentioned twice in 1987 when we classify him as a celebrity and 14 times in 2003/4 when we classify him as a politician. But there are some cases that are more tricky e.g. is Jesse Jackson a religious leader or a politician (we put him in the latter category), is Ross Perot a businessman or a politician (we classify him as the latter as he only appears after his political campaigns). Our detailed classification is available online - while some may dispute some of our classifications we do not think our results are likely to be altered with one notable exception. The exception is Hilary Rodham Clinton who at some point probably moved from being a first lady (her first mention is in 1993) to being a politician in her own right.

The question specifically asks about a living person. So, for example it seems that in 2013 some people responded Nelson Mandela and this was not a valid answer. But starting in 2000, the response God/Jesus appears seemingly allowing for the validity of the Resurrection and the fact that God is a man. To avoid controversy, we classify the handful of such responses as a religious leader.

3.2 A First Look at the Data

We start by looking at the broad categories of responses. The first panel of Table 3.2 presents - by decade - the fraction of first responses by different types of individual for men and Table 3.3 does the same for women. At this stage, we use the broad list of categories defined at the end of the previous section in order to make clear that no category we omit in the later analysis is quantitatively important. The first panel uses our preferred form of the data, using first responses only and restricting the number of named individuals to 13 a year for men and 11 for women.

However, to show that our results are not sensitive to these decisions the second panel reports all first responses (in which the number of named individuals varies by year) and the third panel includes second responses (years prior to 1960 are

excluded as the question is not asked and after 1999 when a change in the routing means there are very few second responses).

The first column of Tables 3.2 shows the fraction of responses in different categories over the whole period 1948-2013 inclusive. For men, the category with the largest vote share is distributed between the don't know/ no one category with 27% and the president/vice president category with 26% of all votes. This is followed by religious leaders with 9%, other politicians with 7%, international political leaders with 5%, and all other categories with a very small share (apart from the unidentified category). For example, it has always been the case that only small numbers of people cite businesspeople and celebrities as their most admired person, so there is no evidence here that US society is becoming increasingly materialistic or celebrity-obsessed. It is the domination of politicians in general and the president/vice-president in particular that is most striking.

Table 3.3 does the same for women - here the category of president/vice-president is replaced by a relative of them, most commonly their wife. A higher proportion say don't know/no one for women than for men. But, overall the pattern of responses is very similar. Comparing the first with the second and third panels, one can see that our modeling choices to ensure consistency do not hide any important patterns.

These figures refer to the 65-year period as a whole over which a lot may have changed. So the second through seventh columns of Table 3.2 and 3.3 break up the responses by broad decade. Comparing the 2000s with the 1950s perhaps the most striking feature of the data is how little has changed - in both periods about one-third cite the president or vice-president, about one quarter cite don't know or no one (slightly higher in the later period). But this masks quite dramatic change in the intervening years - the share admiring the president or vice-president slumped to 15% in the 1970s with the loss of support going to the don't know/no one category and to unidentified others. Table 3 shows similar trends in the types of women who are admired.

Because Tables 3.2 and 3.3 group years into decades and there might be important within-decade trends, we group the responses into 4 main categories in what follows - those who name a president/vice-president, those who name no one or say they don't know, those who name someone else who is a public figure, and those who name family and friends. The trends in the vote shares for these four categories are shown in Figure 3.1 for men and Figure 3.2 for women the three different measures - the adjusted first responses, the raw first responses and the first and second responses.

Although the responses are clearly influenced by short-term events and there is considerable year-to-year variation in the proportions responding in various categories, there are also longer-term trends that are observable. To make these clearer Figures 3.3 and 3.4 also report for men and women a 5-year moving average of the results for the adjusted first responses.

For the fraction reporting a president/vice-president there is a rise in the proportion from the late 1940s until a peak in the early 1960s when about 40% of respondents named the president/vice-president. There is then a long period of decline reaching a low point of 6.5% in 1974. There was then a recovery to about 20% in the 1990s before a startling rise to over 40% in 2001. Since then there has been a general decline though with a rise in 2008, when Barack Obama was first elected. We are currently in a period of declining support for the president/vice-president though it is hard to say where this will eventually go. There are some obvious events that one might suggest lie behind some of these trends - for example, the Vietnam War, Watergate and 9/11. In the fourth section we investigate the correlation with other measures of trust in government.

Turning to the fraction reporting don't know/ no one, this was stable at about 20% in the 1950s before then rising to about 30% in the period 1970-2000 though with considerable variation from year-to-year. It fell after 9/11 but has since bounced back to about 20%, now though in 2011 it was above 30% again.

But the rise in the share of don't known/ no one; in the 1960s and 1970s only makes up for about half of the striking fall in the vote share loss for the president/vice-president in this period. The other half of the decline went to the 'unidentified' category i.e. votes became much more dispersed. Figure 3.A.1 and 3.A.2 in the Appendix provides information about the composition of the unidentified group for male and female most admired persons.

This section has documented the trends in the type of person who is admired in the United States. But, while the description of these trends is interesting, we need to have an interpretation about the nature and purpose of admiration in order to attach any significance to them - that is the purpose of the next section.

3.3 Interpreting Admiration

Philosophers, psychologists and political scientists have been interested in admiration - its nature and purpose - since at least Classical Greece. Here we provide the briefest of overviews (see Brennan and Pettit, 2004, for more extensive discussion)[3].

3.3.1 What is Admiration?

Many have offered a definition of admiration e.g. Adam Smith in the Theory of Moral Sentiments wrote that "the sentiment of complete sympathy and approbation, mixed and animated with wonder and surprise, constitutes what is properly called admiration" (Smith (2002), p58). In more recent academic work, admiration

[3]It should be noted that Brennan and Pettit (2004) seek to distinguish between esteem and admiration in a way that we do not. They are at pains to emphasize that esteem (in their sense) and admiration, while sharing the feature of being evaluative are distinct with esteem being directive (in the sense of conveying an action to be emulated) while admiration is non-directive (p21-22). We are not so convinced that the question 'who do you most esteem' would elicit very different answers from 'who do you most admire' so think esteem and admiration are closer in practice than their analysis would suggest.

is generally classed as one of the moral emotions (Haidt (2003)) in the family of other-praising emotions. For example, in the global categorization of emotion types (Ortony et al., 1988, pp. 145) claim that admiration is one of the 'appreciation' emotions and defines it as the emotion that is "a reaction of approval for some praiseworthy action". Different authors differ in the extent to which related emotions are seen as simply different words for the same underlying emotion or different variants of emotion[4]. For example, Ortony et al. (1988), group admiration with appreciation, awe esteem and respect but(Brennan and Pettit, 2004, pp. 21-22) seek to distinguish between esteem and admiration though admitting they do share important features. And some authors seeks to make distinctions in terminology for academic purposes - for example, Algoe and Haidt (2009) use the term admiration to refer to non-moral excellence (e.g. sporting excellence) and use elevation for moral excellence[5]. But - as they acknowledge - this does differ somewhat from common usage and many respondents might struggle with the question 'what living person do you elevate the most?'

And it is the common usage meaning of admiration that will be useful in explaining our data and it is likely that this does not mean exactly the same thing to all our respondents. But it does seem plausible to think that all people have a good opinion of those they say they admire the most. One way of illustrating this is that individuals are named much less frequently after being engulfed by some scandal with Watergate being the most prominent example (Nixon drops from 9% in 1972 to 5% in 1973 and never recovers).

3.3.2 The Purpose of Admiration

A long line of thinkers from at least Ancient Greece onwards have argued that admiration is important in human society. But there are a number of arguments put forward for why admiration is important.

First, there is the idea is that individuals want to be admired and this encourages them to behave in ways that make them admired. The benefit from admiration might be in material terms e.g. one's economic relations go more smoothly with those who admire you, or it might be desired for its own sake. According to this latter view, humans evolved a desire for admiration (see Henrich and Gil-White (2001), for one theory of why this might have evolved and Plutchik (1980), Frank (1988) and Ekman (1992), on why emotions in general might have evolved).

Secondly, there is the idea that the purpose of admiration is not to influence how

[4]There is also a neurological study of the areas of the brain that are triggered by the feeling of admiration (Immordino-Yang et al. (2009)). This study distinguishes between admiration for virtue (i.e. for someone who has done something 'good') and admiration for skill (i.e. for someone who has a high level of achievement) and shows that while these emotions activate some similar areas of the brain, they also activate different areas suggesting they are not exactly the same emotion even though the single word 'admiration' can be used for them

[5]It is not clear that this distinction is well-supported by their own data - for example as many respondents used the word admiration to describe their feeling in a condition meant to induce a feeling of elevation as they did in the condition designed to produce a feeling of admiration (p110).

others behave but to influence how we behave ourselves. Algoe and Haidt (2009) quote Thomas Jefferson "When any . . . act of charity or of gratitude, for instance, is presented either to our sight or imagination, we are deeply impressed with its beauty and feel a strong desire in ourselves of doing charitable and grateful acts also". According to this view, the admiration (or elevation to use Jefferson's term) of acts inspires us to seek to emulate that behavior i.e. the purpose of admiration is to influence our own actions. They also suggest that the act of admiration may simply make us happier. According to this view, the type of people we admire tells us about who we aspire to be.

Thirdly, there is the view that we have a pre-disposition to admire certain types of people -for example, Cuddy et al. (2008) argue that we admire those who we think are both 'competent' and 'warm' i.e. successful others whose actions benefit oneself. They also argue that we tend to ascribe these virtues to those who are high in the social hierarchy and that this helps to provide order in society (see also Sweetman et al. (2013)). Adam Smith, was of a similar view that we tend to admire those of high status - "our obsequiousness to our superiors more frequently arises from our admiration for the advantages of their situation, than from any private expectations of benefit from their good-will" ((Smith, 2002, pp. 63)) - though he did not think it necessarily a good thing - "that wealth and greatness are often regarded with the respect and admiration which are due only to wisdom and virtue; and that the contempt, of which vice and folly are the only proper objects, is often most unjustly bestowed upon poverty and weakness, has been the complaint of moralists in all ages" ((Smith, 2002, pp. 72)).

But even if we understand why individuals like being admired, we also need an explanation of why we admire others. One view is that we expect direct returns from those we admire - that is obviously implausible in most of the cases in the Gallup survey, as one cannot credibly believe that to admire the President leads to personal gain. Another view is that we have evolved an automatic ability to admire others that then helps to motivate those who are admired. And a third view is that individuals get a direct utility from admiring others - that the act of admiring makes individuals feel good or that those admired act as role models about how we would like ourselves to be (see, for example, Algoe and Haidt (2009)).

According to all of these interpretations of what it means when we admire somebody, it seems valid to conclude that it tells us something about position in the social hierarchy, what behaviors we view as pro-social or who we would like ourselves to be. And it is clear that the types of behavior and people that are admired vary across cultures and over time within a single culture (see, for example, Appiah (2011), for some examples of dramatic change in what is admired). So changes in the types of people who are admired might reasonably be used to infer something about the way in which values are changing.

Because of the connection with admiration with how one views the behavior of others, we might expect that admiration data is linked to, though not identical to,

measures of social capital in general, and trust in particular, something that has been argued to be of critical importance in underlying successful societies (e.g.Fukuyama, 1996; Putnam, 2001). That there might be such a link is perhaps not surprising - saying that one admires no one suggests that one does not have a high opinion of the moral worth of others as does saying that one does not think most people can be trusted. The next section investigates the hypothesis that there is a link between admiration and trust.

3.4 Trust and Admiration

Although one might find the results to this point intriguing, we have done little to establish their significance. In this section we investigate the link between admiration and trust, perhaps the most widely used measure of social capital (though there is controversy about the meaning and interpretation of responses to trust questions - see, for example, Glaeser et al., 2000; Uslaner, 2002; Nannestad, 2008; Johnson and Mislin, 2012).

To establish the connection between trust and admiration we turn first to the one study we could find in which there is a measure of both trust and admiration in the same data set - this is the classic book by Almond and Verba (1963), a study of the civic and political culture in the United States, United Kingdom, Germany, Italy and Mexico[6]. It involved a questionnaire (conducted in 1958 in all countries except the US, where it was conducted in 1960) that asked a variety of questions about political and civic attitudes and involvement[7]. Of interest for our purposes is that it asked a question about admiration, which took the form "aside from people you know personally – of all the, people you hear or read about, could you name one or more individuals you admire very much". This is quite similar to the question in the Gallup survey though explicitly excludes the 'family and friends' category as a possible response. Although the question asks for a specific person, the responses are grouped by type of person in the data set available to us, fortunately using very similar categories to the ones we have used. The responses are tabulated in Table 3.4, with a comparison of the Gallup survey responses for the same year. The two surveys for the US have a similar pattern of responses - politicians are the most common answer, followed by don't know/ no one. But, they are not identical - entertainers are mentioned more frequently than religious leaders in the Almond-Verba survey but not in the Gallup survey. We also include the responses for other countries as a comparison.

Turning to trust, the Almond-Verba survey asks a number of questions about trust: "some people say that most people can be trusted. Others say you can't be too careful in your dealings with people. How do you feel about it?" (this is the classic generalized trust question) as well as "If you don't watch yourself people will

[6]We mostly discuss the questions used in chapter 9.

[7]This data set is available through ICPSR - Almond-Verba (2009).

take advantage of you. Do you agree or disagree with that?", and "human nature is fundamentally cooperative. Do you agree or disagree with that?" Almond and Verba (1963) documented relatively high levels of trust in the US and UK and lower levels elsewhere, with very low levels in Italy - this is shown in the lower panels of Table 3.4. But, of more interest to us is the correlation with the responses to the admiration question. Table 3.5 presents the US data distinguished by the type of person who is admired. The first panel shows that those who report they admire no one or don't know have markedly lower levels of trust than those who report admiring a politician or an entertainer (though similar levels to the small group who admire others). However, the second panel shows that those who don't admire anyone are less likely to think one has to watch oneself lest people take advantage. The third panel shows there are no marked differences in beliefs about whether human nature is fundamentally co-operative. The Almond-Verba questionnaire also asked directly about the character qualities that are admired i.e. we do not have to infer them from the type of person who is admired. Results are presented in the final panel of Table 3.5. The most common response is that people admire those who are generous (mentioned by almost 30% of people) followed by 16% who admire someone who does his job well, and 15% each for those who are respectful and keeps himself to himself[8]. But there are significant differences between the qualities admired by those who admire someone and those who report don't know/ no one. The latter group are less likely to admire those who are generous and more likely to admire those who keep to themselves. The over-riding image is that those who reply don't know/ no one are more isolated individuals not embedded in a social structure that they have faith in.

To investigate further the relationship between trust and admiration, we do a regression analysis investigating the characteristics that are associated with admiring someone and being trusting. As characteristics we include gender, age, race, education and political affiliation. The results for such a model in the Almond-Verba data set are reported in Table 3.6. The most consistent finding is that those who are more educated are more likely to admire someone, to trust others, and to think others don't take advantage of you. Non-whites are significantly less trusting but, although they are less likely to report admiring someone this difference is not significant. Of course, there are other factors apart from the ones we control for that influence both admiration and trust. The correlation in the residuals among the first three columns in Table 3.6 are positive suggesting that those unobserved factors that cause someone to admire someone also cause them to trust others. Next we investigate the hypothesis that there is a single underlying factor causing both admiration and trust which can be modeled as the hypothesis that the coefficients in the different columns are proportional - the chi-squared test statistic for this hypothesis is reported in the 'beta proportionality test' row of Table 3.6. One accepts this hypothesis. Finally, as a comparison, the final two columns of Table 6 also report a

[8]Note the masculine nature of the responses is in the original survey.

regression model for the Gallup data for the most admired man and woman for the years around the period of the Almond-Verba study - the determinants are similar.

Overall, the Almond-Verba data does support the hypothesis that there is a link between admiring someone and measures of trust. But, this is data from one year over 50 years ago and this link might not apply at all times. Unfortunately there is no way to check directly whether this relationship holds in other years because we do not have data sets containing questions on both admiration and trust. But we can look for indirect evidence by seeing whether the demographic characteristics associated with distrust are also associated with admiring no one. For this exercise we use data on trust from the American National Election Study (ANES) and the General Social Survey (GSS).

Table 3.7 presents the results. The first two columns report results where the dependent variable is the measure of generalized trust in the GSS and the ANES. The regressors included are race, age, gender, religion, political affiliation, political affiliation interacted with the party of the incumbent president, year and region dummies. These variables are chosen partly because they are standard demographic variables but also because they are available on a consistent basis in all surveys. We did experiment with including some other variables (e.g. employment) that were only asked in some surveys but they were never significant and we present the specification with the largest number of observations. The college educated, the old and men are more likely to trust others, non-whites and political independents less likely to[9]. The results for the GSS and the ANES are very similar and our results are similar to those presented in Alesina and La Ferrara (2002) who are able to include a wider set of explanatory variables as they are not constrained to variables that appear in multiple data sets.

The third and fourth columns of Table 3.7 report estimates of models where the dependent variable is trust in the federal government using questions from both the GSS and ANES. In both surveys the college educated and democrats are more likely to trust the government, as are Catholics. The old in both surveys are less likely to trust government. There is also a large negative effect if the incumbent President is not from the party you support. But there are also a number of variables - race and gender where the coefficient is differently signed in the two datasets.

Columns 5 and 6 of Table 3.7 analyze the Gallup admiration data to investigate the factors associated with admiring different types of people. To keep the analysis of the Gallup data relatively simple, we aggregate the responses into three main categories, president or vice-president (relatives of politicians for women), all others and don't know/ no one. Since there is no natural ordering of the three major classifications, we estimate a multinomial logit specification for the type of person admired. We choose the classification Don't know/ No One as the reference category. The coefficients presented in the table are multinomial log-odds ratios. The standard interpretation of the multinomial logit is that for a unit change in the pre-

[9]More variables are significant in these regressions than in the Almond-Verba data because the sample size is much larger.

dictor variable, the logit of outcome m relative to the reference group is expected to change by its respective parameter estimate given the other variables in the model are held constant. For instance, the coefficient on Age is significant for All Others. Thus the interpretation of the coefficient would be that for an increase in Age by one year, the multinomial log-odds for All Others relative to Don't know would be expected to decrease by 0.005, while holding all other variables in the model constant.

The results in column 5 of Table 3.7 suggest that the older you are, the more likely you are to name the President or Vice-president and less likely to say someone else relative to the referent group Don't Know/ No One. Relative to Protestants, Catholics are more likely to vote for a member of the Society (which also includes religious leaders) as opposed to Don't Know/ No One. All religions have a lower preference for the President or Vice-President relative to the Protestants while people with minority religions or no religion are more likely to say Don't Know/ No One than All Others when compared to Protestants. Regarding respondent's political affiliation, Democrats, Independents and Other parties are more likely to say Don't Know/ No One than name a person, may it be the President or Vice-president or anyone else. Finally, the higher the education you have, the more likely you are to vote for someone instead of saying Don't Know/ No One when compared to persons with less than college education.

Column 6 of Table 3.7 presents the same analysis for most admired females. Like most admired males, age seems to be negatively correlated to naming a most admired female relative to saying Don't Know/ No One. Non-white respondents are more likely to say a female name than Don't Know/ No One. On the other hand, men are more likely to say Don't Know/ No One then name a most admired female. Regarding the respondent's religion, Catholic and Jewish persons are more likely to mention a most admired female compared to Protestants, while persons of no religion or minority religions are less likely to name a most admired female. Democrats have a positive correlation with naming Relatives of Politicians as opposed to saying Don't Know/ No One when compared to Republicans. This may be driven by the dominance of Hilary Clinton as the most admired female over the last 15 years. Consistent with findings regarding education and most admired males, we observe the same relationship with respect to most admired females; the higher the schooling you have, the more likely you are to vote for someone instead of saying DonâĂŹt Know/ No One when compared to persons with less than college education.

The rows at the bottom of Table 3.7 labelled 'Trust People GSS' etc take the estimated coefficients from the different regressions in Table 3.7, compute the predicted values of trust and the probability of admiring a particular type of person and then sees whether these are positively correlated or not. We adopt this procedure because we do not have data where we observe both trust and admiration in the same data set and this provides a simply way to see whether the types of people who, for

example, admire the president are also likely to trust government. The correlation between the predicted levels of admiration for the president/vice-president has a correlation of 0.46 and 0.47 with the predicted level of trust in government i.e. there is a strong positive relationship. There is also a strong negative correlation between the predicted level of admiring 'No one' and trust in both people and government. Again, we see a link between the admiration and trust data.

This relationship is a cross-sectional one and we might also be interested in whether the variation over time in admiration and trust is also correlated. To investigate this we compare trends in measures of trust in government from the GSS and ANES with the fraction of persons voting for the president or vice-president from the Gallup data. Figure 3.5 and figure 3.6 show the time series variation [10]. As is well-known (see, for example, Alford (2001)) trust in government fell precipitously in the 1960s and 1970s before recovering somewhat, then spiking up around 9/11 and falling back subsequently. Both the figures also show the fraction of respondents admiring the president or vice-president - the correlation with trust in government is very clear showing, again, the link between admiring politicians and trust in government.

This is interesting because it allows us to infer something about trust in government in the 1950s before we have very good data. White (1982) argued that the 1945 victory had a positive effect on the view of government that lasted for a generation. But, some doubt has been cast on whether the 1950s were so 'golden'. For example, Bennett (2001) uses a handful of studies (e.g. Hyman and Sheatsley, 1954; Mitchell, 1959) reporting responses to a rather disparate set of questions (thus making identification of trends difficult) before the ANES data starts in 1958, arguing that American attitudes to government and politicians were ambivalent in that period. And (Hodge et al., 1966, table 7), using some NORC surveys of the prestige of a wide range of occupations found that political/government occupations were one of only two broad occupational groups (the other being businessmen) where occupations had declined in prestige from 1947-1963. However the Gallup data on the admiration of the president/vice-president suggests that trust in government was at a very high level in the 1950s though it did peak around 1960.

We performed the same time-series exercise for generalized trust, relating it to the fraction reporting 'don't know/ no-one' - however we fail to see any meaningful correlation between the two measures. There are a number of possible reasons why the cross-section relationship does not translate to the time-series for generalized trust. One caveat of the Gallup data is the way responses have been grouped. In particular, until 1977 (other than for 3 years in the late 40's and early 50's) the responses were grouped together if one admired no-one or said don't know. Since admiring no-one is clearly distinct from saying don't know, it is not surprising

[10] All of the estimates in Table 3.7 include year effects, so assumes that the impact of different regressors does not vary with time. The Appendix presents some figures to show this is a good assumption in the data - the year-to-year variation in the type of person admired is very similar for all demographic groups and the time series variation is larger than the cross-section variation.

that we do not observe any strong correlation between generalized distrust and responding 'don't know/ no-one'. However, we are able to carry out the same exercise for the years in which there is distinct coding of the two responses. The GSS has asked a question on generalized trust since its inception in 1972 and, as can be seen from Figure 3.7, this shows a downward trend at least since 1980 though with considerable volatility. The ANES has asked a question about generalized trust in a number of years back to 1958 (there are also some earlier surveys - see, for example, Smith (1997) but it is hard to argue these are consistent) - these are shown as points in Figure 3.7 as to join them up and infer a trend is potentially misleading. Figure 3.7 shows that while there is volatility in this measure of generalized trust from the admiration data, it does pick up the fall since 1980 as seen in the GSS data, which has been the subject of widespread interest and research (e.g. Putnam, 2001; Uslaner, 2002; Robinson and Jackson, 2001; Clark and Eisenstein, 2013; Nannestad, 2008, for an overall review). One should also note that the series on generalized trust from the GSS and ANES also do not show a strong correlation even though they are responses to the same question - this is perhaps because responses are sensitive to framing and context - see (Smith (1997)). Although considerable caution is obviously warranted here the fraction reporting that they admired 'no-one' in the early 1950s was at very low levels, consistent perhaps with generalized trust being high in that period.

Using this link between admiring no-one and generalized trust, we can speculate about trends in trust prior to the start of the GSS in 1972. The admiration data suggests that generalized trust was on a downward trend from peaking in the late 1940s. Interestingly, the peak in generalized trust in Putnam (2001) analysis of trends in social capital occurs almost a decade later in 1960, though he too lacks a long and consistent time series on generalized trust. However, without granular data for the missing years, it is difficult to make any definite claims.

In this section we have argued that there is a link - albeit imperfect - between admiration and trust. Admiring the president or vice-president is most closely linked to trust in government and admiring other persons linked to generalized trust. This link exists in both the cross-section and the time series. That there might be such a link is not surprising - social capital is about group formation and these groups very rarely have formal contracts governing who is supposed to do what. As a result one has to trust people and have a favorable view of their public-spiritedness, something that naturally leads to admiration of others.

3.5 Media and Admiration

In this section we attempt to investigate the role of the media in influencing who, if anyone, is admired. The role of the media has been hotly debated in the literature on social capital - for example Putnam, 2001; Norris, 1996; Newton, 1999 inter alia.

The form of media we consider here are newspapers. There are two advantages

of using newspapers over other forms of media. First, newspapers have been around for a long period of time, thus giving us significant time variation and second, newspaper markets are geographically divided by the extent of circulation and local news component. The data for media's influence on cultural role models is obtained from the NewspaperArchive.com. It is the largest newspaper archive online with 130 million-page database that captures coverage from valuable local newspapers throughout North America, the U.K., and select countries from 1607 to the present. Because of its focus on small newspapers, researchers can search for newspapers and keywords by disaggregated locations up to the state level. Further, print media allows us to get variation in coverage both over time and over space. We use the database to search for complete names to construct a spatially disaggregated count of newspaper presence for each named person mentioned in that specific year and state.

We normalize the media presence of name i in each state s and year t by the news count of the most commonly used words. Thus the newspaper presence is defined as:

$N_{ist} = \frac{count\_of"name"_{ist}}{count\_of"that/would"_{st}}$

and standardized for ease of interpretation.

Table 3.8 presents summary statistics related to the variables used in the analysis. After cleaning the data, we remain with an unbalanced panel of 9,403 Name by State by Year observations. As a first indication that there is a correlation between media mentions and being admired we plot in Figure 3.8 the time series of the measure of mentions of different types of people and the levels of admiration of those types. The positive correlation between the two measures is very clear. But this does not establish a positive correlation between admiration and media mentions of individual people. To investigate this we report some statistical models in Table 3.9.

Given the nature of the data, a Poisson regression is appropriate since the dependent variable is a count and often a small number. Since the sampling is not representative at the state level, we have some states with more unique mentions than number of respondents in other states. To address this issue, we create a yearly balanced panel (i.e persons mentioned in state 'A' may not be named in state 'B', we replace mentions for people who are not mentioned in a given state with zeroes) for the empirical analysis. But we do not include in our sample individuals who received zero votes in all states in any year.

Indexing name by i, state by s and years by t, our problem may be stated as one of estimating:

$$V_{ist} = \beta_0 + \beta_1 N_{ist} + X'_{ist}\beta_j + \epsilon_{ist} \tag{3.1}$$

Where X denotes a vector of observed individual characteristics and ϵ_{ist} describes unobserved contributors to voting response in the survey. We are interested in the coefficient of N, the news elasticity of votes.

The first column of Table 3.9 shows that the number of mentions N_{ist} in the

Gallup data is positively correlated to newspaper presence when we do not control for any other factors. The second column then includes controls for age and being non-white. Whites are more likely to be admired, as are the old. But the inclusion of these controls makes little difference to the estimated link between media mentions and admiration. Adding in year (column 3), region (column 4) or state (column 5) fixed effects also makes little difference to the estimated link. This relationship between media mentions and admiration is unsurprising - if someone has done something admirable in a year one is both more likely to be mentioned in the newspapers and in the Gallup data.

But the positive relationship between media mentions and admiration also holds (albeit weaker) if one includes name fixed effects (column 6) and name-year fixed effects (column 7). In this last specification we are effectively controlling for what an individual has done in a particular year and finding that states in which that person receives a relatively high share of media mentions also receives a relatively high share of votes in the most admired poll. This is a demanding specification but a positive significant link remains. We have not established whether this link is causal - it could run from admiration to media rather than the other way round. But there does seem to be a robust link.

3.6 Conclusion

For 65 years since the late 1940s Gallup has, every December, asked Americans about the living man and woman they most admire. This is perhaps the longest run of consistent data on attitudes in any data set. In this chapter we have documented the way in which the responses to this question have changed and argued that the changing nature of responses to this question tells us something interesting about the way in which society has been evolving. The pattern of responses in the 2010s is (perhaps surprisingly) similar to those from the late 1940s with the most common response being a current or ex-president or vice-president (with about one-quarter of votes), followed by a sizeable group (again, almost one quarter) who say they don't know or admire no one. Other politicians, religious leaders and family and friends are the next most common categories of response. Americans never have and still do not often name celebrities and business people. But this similarity in the beginning and the end hides considerable change in the intervening years with a very marked collapse and then recovery in the vote share of the president and vice-president.

We have drawn on the disparate literature on admiration to argue on theoretical grounds that admiration data is likely to tell us something about the types of people and actions that are viewed positively so is likely to be informative about levels of social capital in general and trust in particular, both trust in government and generalized trust. We provide empirical support for this hypothesis using the Almond-Verba data from 1960 that asks about both trust and admiration and the

ANES and GSS surveys to highlight the cross-sectional and time-series variation in the trust and admiration. We conclude that admiring a president or vice-president is a good measure of trust in government and admiring no-one a good measure of generalized distrust. Using this link we can say something about the evolution of trust back to the late 1940s before we have reliable other sources of data. We argue that trust in government was high from the late 1940s though peaked about 1960.

Finally, the chapter investigates the link between admiration and media mentions. We show that people who receive a relatively large number of mentions in newspapers in a particular year and state are also more likely to be admired to people in that year and state. Whether this relationship is causal is left for further research.

Table 3.1: Most Admired Male and Female, 1947-2013

Year	Admired Male	Vote Share	Admired Female	Vote Share
1947			Eleanor Roosevelt	0.29
1948	Harry Truman	0.22	Eleanor Roosevelt	0.30
1949	Dwight Eisenhower	0.12	Eleanor Roosevelt	0.32
1951	General Douglas Mcarthur	0.21		
1952	Dwight Eisenhower	0.26	Eleanor Roosevelt	0.30
1954	Dwight Eisenhower	0.27	Eleanor Roosevelt	0.27
1955	Dwight Eisenhower	0.26	Eleanor Roosevelt	0.25
1958	Dwight Eisenhower	0.22	Eleanor Roosevelt	0.26
1961	John F Kennedy	0.23	Eleanor Roosevelt	0.31
1963	Lyndon Johnson	0.21	Jacqueline Kennedy	0.53
1965	Lyndon Johnson	0.19	Jacqueline Kennedy	0.36
1966	Lyndon Johnson	0.14	Jacqueline Kennedy	0.24
1967	Dwight Eisenhower	0.12		
1970	Richard Nixon	0.10	Mamie Eisenhower	0.06
1971	Billy Graham	0.09	Golda Meir	0.11
1972	Richard Nixon	0.11	Pat Nixon	0.09
1973	Henry Kissinger	0.11	Golda Meir	0.17
1974	Henry Kissinger	0.16	Golda Meir	0.10
1977	Anwar Sadat	0.10	Golda Meir	0.06
1978	Jimmy Carter	0.09	Betty Ford	0.09
1979	Pope John Paul II	0.12	Rosalyn Carter	0.08
1980	Pope John Paul II	0.08	Mother Teresa	0.06
1981	Ronald Reagan	0.20	Mother Teresa	0.06
1982	Ronald Reagan	0.15	Margaret Thatcher	0.09
1983	Ronald Reagan	0.20	Margaret Thatcher	0.12
1984	Ronald Reagan	0.12	Margaret Thatcher	0.16
1985	Ronald Reagan	0.17	Margaret Thatcher	0.11
1987	Ronald Reagan	0.11	Mother Teresa	0.14
1988	Ronald Reagan	0.20	Mother Teresa	0.13
1989	George H W Bush	0.14	Margaret Thatcher	0.13
1990	George H W Bush	0.17	Margaret Thatcher	0.25
1992	George H W Bush	0.10	Mother Teresa	0.13
1994	Bill Clinton	0.09	Mother Teresa	0.12
1995	Bill Clinton	0.12	Mother Teresa	0.15
1996	Bill Clinton	0.13	Mother Teresa	0.22
1997	Bill Clinton	0.10	Hillary Clinton	0.10
1998	Bill Clinton	0.12	Hillary Clinton	0.24
2000	Bill Clinton	0.07	Hillary Clinton	0.19
2001	George W Bush	0.38	Laura Bush	0.12
2002	George W Bush	0.27	Hillary Clinton	0.07
2003	George W Bush	0.29	Hillary Clinton	0.16
2004	George W Bush	0.25	Hillary Clinton	0.13
2005	George W Bush	0.21	Condoleezza Rice	0.13
2007	George W Bush	0.10	Hillary Clinton	0.16
2008	Barack Obama	0.30	Hillary Clinton	0.19
2009	Barack Obama	0.28	Hillary Clinton	0.18
2010	Barack Obama	0.21	Hillary Clinton	0.18
2011	Barack Obama	0.17	Hillary Clinton	0.21
2012	Barack Obama	0.29	Hillary Clinton	0.25
2013	Barack Obama	0.15	Hillary Clinton	0.16

Note: This table reports vote shares based on first response only. The category Family and Friends was ranked first in the years 1980 for Most Admired Males and 1977, 1980, 1981 and 1982 for the Most Admired Female.

Table 3.2: Major Classification Most Admired Male, by Decades

		Decade					
Group (First Response Adjusted)	**Total**	**1948-1959**	**1960-1969**	**1970-1979**	**1980-1989**	**1990-1999**	**2000-2013**
Academics and Experts	0.91	0.81	1.28	0.00	2.39	0.33	0.32
Business Persons	0.94	0.64	0.00	0.00	2.44	1.97	1.24
Don't Know/ No One	27.13	21.15	24.19	32.35	30.60	30.94	25.26
Friends & Family	4.31	1.38	3.13	4.42	6.59	6.70	4.48
International Political Leader	4.51	8.42	4.22	3.65	4.16	3.88	3.33
Media, Artists, Sports	0.62	1.42	0.00	0.60	0.38	0.65	0.99
Other Politicians	7.27	13.01	6.74	12.25	3.12	3.88	4.64
Religious Leaders	9.09	7.48	8.94	11.06	10.94	8.90	7.09
Royalty	0.01	0.00	0.00	0.00	0.08	0.00	0.00
USA President or Vice	25.78	33.20	33.40	15.02	18.06	18.75	31.60
Unidentified	19.42	12.50	18.11	20.64	21.25	24.01	21.05
Group (First Response)							
Academics and Experts	1.77	3.16	2.65	0.79	2.55	0.72	0.39
Business Persons	1.15	1.14	0.17	0.26	2.44	2.23	1.42
Don't Know/ No One	27.13	21.15	24.19	32.35	30.60	30.94	25.26
Friends & Family	4.33	1.46	3.17	4.42	6.59	6.70	4.48
International Political Leader	5.16	8.91	5.68	4.54	4.43	4.11	3.47
Media, Artists, Sports	1.98	2.56	1.46	2.48	2.33	1.36	1.68
Other Politicians	9.22	14.81	10.26	14.84	4.56	4.40	5.45
Religious Leaders	9.71	8.15	9.96	11.91	11.11	8.94	7.69
Royalty	0.08	0.23	0.06	0.07	0.09	0.00	0.06
USA President or Vice	26.40	33.71	34.56	15.51	18.68	18.86	32.04
Unidentified	13.06	4.73	7.85	12.82	16.62	21.74	18.05
Group (First & Second Response)							
Academics and Experts	1.07		2.71	0.42	0.18	0.00	
Business Persons	1.08		0.17	0.26	2.44	2.23	
Don't Know/ No One	29.00		24.19	32.35	30.60	31.36	
Friends & Family	4.90		3.17	4.42	6.59	6.70	
International Political Leade	4.83r		5.68	4.54	4.43	4.11	
Media, Artists, Sports	1.87		1.46	2.48	2.07	1.36	
Other Politicians	10.51		11.32	16.12	6.93	5.12	
Religious Leaders	10.66		9.90	11.91	11.38	8.94	
Royalty	0.06		0.06	0.07	0.09	0.00	
USA President or Vice	22.65		33.50	14.61	18.68	18.86	
Unidentified	13.37		7.85	12.82	16.62	21.32	

Note: This table reports vote shares by decades and major classification. The first panel reports vote shares for first response, restricting number of named individuals to 13 a year (the rest are classified as unidentified). The second panel reports vote shares for first response without any adjustment. The third panel includes second responses (years prior to 1960 are excluded as the question is not asked and after 1999 when a change in the routing means there are very few second responses).

Table 3.3: Major Classification Most Admired Female, by Decades

		Decade					
Group (First Response Adjusted)	**Total**	**1948-1959**	**1960-1969**	**1970-1979**	**1980-1989**	**1990-1999**	**2000-2013**
Academics and Experts	4.41	5.02	1.58	1.43	9.88	10.85	1.39
Don't Know/ No One	33.59	35.90	32.39	41.55	32.95	29.36	28.70
Friends & Family	5.92	2.52	4.73	6.15	7.59	8.26	6.79
International Political Leader	6.23	3.66	2.42	9.98	11.83	7.55	2.99
Media, Artists, Sports	3.37	4.23	1.08	1.93	1.98	3.34	7.76
Other Politicians	6.17	5.41	2.55	2.88	4.67	1.49	17.36
Relative of Politicians	22.14	31.61	42.73	16.15	8.53	15.02	14.55
Religious Leaders	0.01	0.08	0.00	0.00	0.00	0.00	0.00
Royalty	1.84	3.45	2.35	0.56	1.61	2.95	0.90
Unidentified	16.32	8.13	10.16	19.37	20.95	21.18	19.55
Group (First Response)							
Academics and Experts	4.99	5.82	1.75	3.01	10.60	10.92	1.47
Business Persons	0.06	0.07	0.00	0.00	0.04	0.00	0.20
Don't Know/ No One	33.59	35.90	32.39	41.55	32.95	29.36	28.70
Friends & Family	6.03	2.52	4.81	6.15	7.59	8.26	7.28
International Political Leader	6.57	3.78	3.03	10.33	12.47	7.64	3.08
Media, Artists, Sports	5.43	6.30	3.53	5.01	4.54	4.02	8.74
Other Politicians	7.15	5.86	2.93	4.67	6.55	2.30	17.94
Relative of Politicians	22.91	31.99	43.17	17.28	10.14	15.29	15.14
Religious Leaders	0.03	0.18	0.00	0.04	0.00	0.00	0.00
Royalty	2.25	3.83	2.71	1.24	2.13	3.18	1.13
Unidentified	10.98	3.76	5.67	10.72	12.99	19.02	16.32
Group (First & Second Response)							
Academics and Experts	5.84		1.75	3.01	10.60	10.92	
Business Persons	0.01		0.00	0.00	0.04	0.00	
Don't Know/ No One	34.52		32.39	41.55	32.95	29.36	
Friends & Family	6.44		4.81	6.15	7.59	8.26	
International Political Leader	8.20		3.03	10.33	12.47	7.64	
Media, Artists, Sports	4.27		3.53	5.01	4.54	4.02	
Other Politicians	4.27		2.93	4.67	6.55	2.30	
Relative of Politicians	23.21		43.17	17.28	10.14	15.29	
Religious Leaders	0.01		0.00	0.04	0.00	0.00	
Royalty	2.23		2.71	1.24	2.13	3.18	
Unidentified	10.99		5.67	10.72	12.99	19.02	

Note: This table reports vote shares by decades and major classification. The first panel reports vote shares for first response, restricting number of named individuals to 11 a year (the rest are classified as unidentified). The second panel reports vote shares for first response without any adjustment. The third panel includes second responses (years prior to 1960 are excluded as the question is not asked and after 1999 when a change in the routing means there are very few second responses).

Table 3.4: Civic Culture - Admiration and Trust

	Country						
Major Classification	**Germany**	**Italy**	**Mexico**	**UK**	**USA**	**Total**	**USAGallup**
All Others	9.15	9.74	6.35	19.73	10.82	11.10	30.33
Don't Know/ No One	44.42	36.75	38.19	24.51	22.06	33.29	21.35
Entertainment	34.77	25.97	32.54	30.84	22.68	29.42	3.91
Politicians	11.66	27.54	22.92	24.92	44.43	26.19	44.41
Trust I - Some people say that most people can be trusted. How do you feel about it?							
Diagree	92.38	80.28	69.80	49.63	44.41	67.23	
Agree	7.62	19.72	30.20	50.37	55.59	32.77	
Trust II - If you don't watch yourself people will take advantage of you.							
Agree	82.47	86.67	95.34	77.38	69.76	82.43	
Disagree	17.53	13.33	4.66	22.62	30.24	17.57	
Trust III - Human nature is fundamentally cooperative							
Disagree	21.93	31.04	12.75	12.73	14.46	18.01	
Agree	78.07	68.96	87.25	87.27	85.54	81.99	

Note: This table reports the relationship between admiration and trust based on the Almond-Verba (1963) Civic Culture Study across 5 countries for the years 1958 for Germany, Italy, Mexico and UK and 1960 for the USA. Data in Column (USAGallup) is obtained from the Gallup Opinion Poll and pertains to the years1958 and 1960 for the most admired man. Entertainment category for Gallup includes persons in News, Media, Sports, Artists, Experts, Academics and Business Persons. All Others category for Gallup includes International Political Leaders, Religious Figures, Royalty, Family and Unidentified persons.

Table 3.5: Civic Culture - Admiration and Trust

	Major Classification				
	All Others	**Don't Know/ No One**	**Entertainment**	**Politicians**	**Total**
Trust I - Some people say that most people can be trusted. How do you feel about it?					
Diagree	55.77	56.13	42.01	37.12	44.41
Agree	44.23	43.87	57.99	62.88	55.59
Trust II - If you don't watch yourself people will take advantage of you.					
Diagree	71.15	81.07	71.50	62.89	69.76
Agree	28.85	18.93	28.50	37.11	30.24
Trust III - Human nature is fundamentally cooperative					
Diagree	18.28	15.93	15.02	12.68	14.46
Agree	81.72	84.07	84.98	87.32	85.54
Most Admired Quality					
Active in public and social affairs	4.76	3.50	5.23	6.84	5.52
Ambitious	7.14	11.45	12.27	10.79	10.88
Does his job well	15.71	17.99	17.95	13.57	15.77
Don't know	2.38	2.34	0.91	0.70	1.29
Generous	28.57	21.50	30.45	33.41	29.59
Keeps himself to himself	15.24	20.33	12.05	12.65	14.48
Lets no one take advantage of him	4.29	2.57	3.41	1.97	2.68
Other	0.48	0.70	0.23	1.04	0.72
Respectful	16.67	13.32	13.86	15.43	14.74
Thrifty	4.76	6.31	3.64	3.60	4.33

Note: This table reports the relationship between admiration, trust and character qualities that are admired for the US sample. The data is based on the Almond-Verba (1963) Civic Culture Study across 5 countries.

Table 3.6: Admiration and Trust

	Civic Survey				Gallup Survey	
	(1)	(2)	(3)	(4)	(5)	(6)
	Admire Someone	Ppl can be Trusted	Ppl Don't Take Adv. of You	Ppl are Cooperative	Admire Male	Admire Female
Non White	-0.012	-0.332***	-0.171***	0.008	-0.062***	0.160***
	(0.054)	(0.063)	(0.050)	(0.051)	(0.023)	(0.023)
Age	-0.000	-0.003**	-0.003**	-0.001	-0.001***	-0.000
	(0.001)	(0.002)	(0.001)	(0.001)	(0.000)	(0.000)
Male	0.029	-0.017	-0.065*	-0.002	-0.002	-0.099***
	(0.032)	(0.038)	(0.036)	(0.028)	(0.012)	(0.014)
Ommitted Category: Republicans						
Democrat	0.030	-0.040	-0.083*	-0.066*	-0.058***	0.115***
	(0.040)	(0.046)	(0.044)	(0.035)	(0.014)	(0.017)
Other Party	0.069	0.025	0.017	-0.011	-0.093***	0.011
	(0.043)	(0.054)	(0.055)	(0.038)	(0.017)	(0.021)
College	0.080**	0.152***	0.182***	-0.002	0.078***	0.141***
	(0.037)	(0.046)	(0.050)	(0.034)	(0.014)	(0.017)
Year FE	.	.	.	.	Yes	Yes
Beta Proportionality Test	.	2.97	3.65	0.20	.	.
Residual Correlation	1	0.12	0.09	-0.03	.	.
Mean	.793	.583	.319	.866	.793	.614
Observations	646	643	630	611	4392	4392

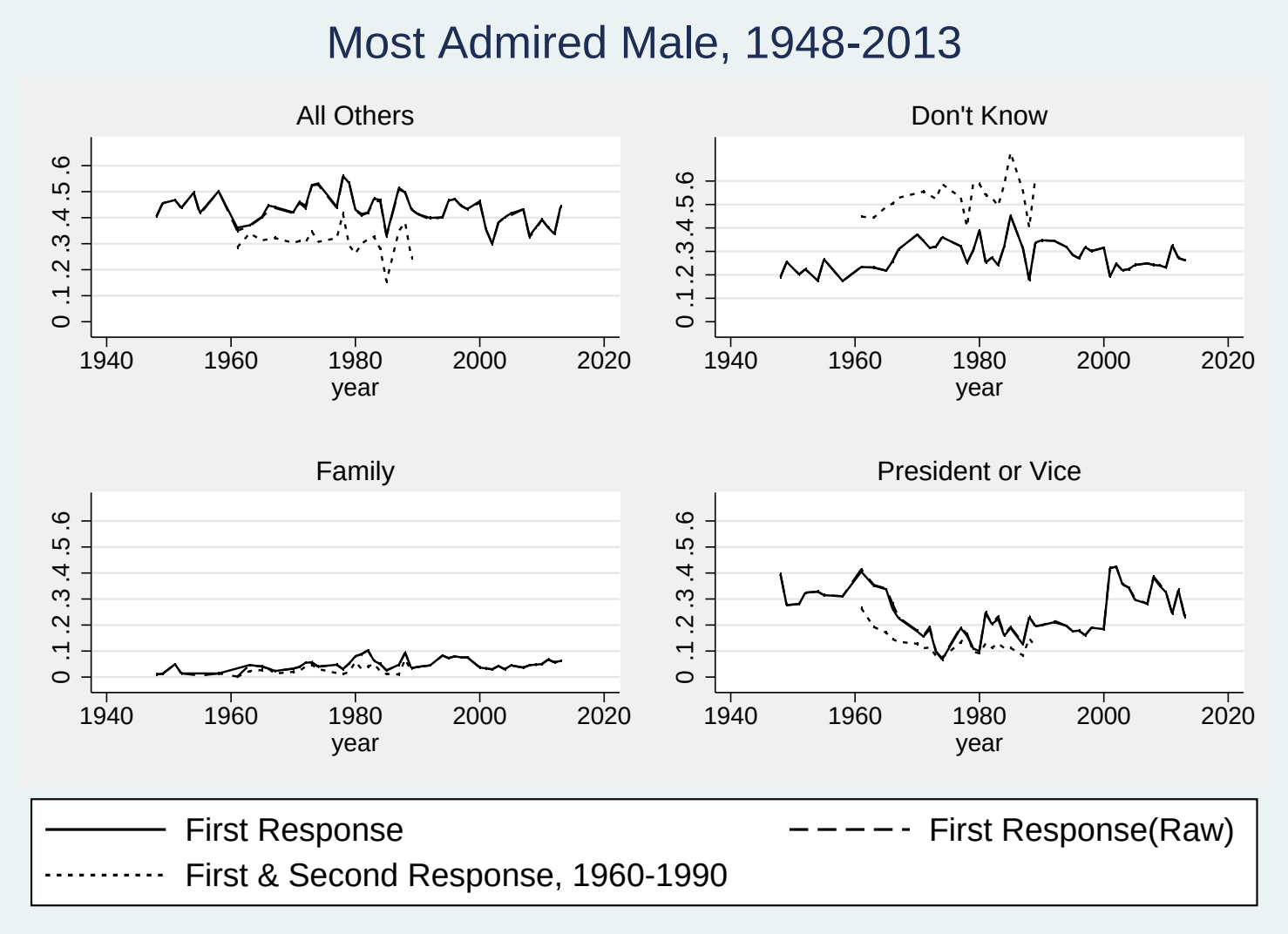
Note: This table presents regression analysis between trust and admiration. Robust standard errors in parenthesis. All regressions include Region fixed effects. The dependent variable in the column 1 to 4 is from the Civic Culture study pertaining to year 1960, while the dependent variable in columns 5 and 6 is from the Gallup Opinion Poll for the years 1958 and 1961. Dependent variables in all regressions are indicator variables taking the value 1 or 0. Non White is a dummy variable for race, Age is measured in years, Male is a dummy variable for gender, Democrat and Other Party are dummy variables for respondents political preferences (relative to being Republican) and college is a dummy variable for having some years of post-secondary education. The beta proportionality test reports the chi-square statistic. For consistency with other trust measures, the dependant variable in column (3) is the inverse of the question.

Table 3.7: Admiration and Trust

	(1)	(2)	(3)	(4)	(5)			(6)		
	Trust-GSS	Trust-ANES	FedTrust-GSS	FedTrust-ANES	Most Admired Male			Most Admired Female		
					All Others	President Vice	Don't Know	All Others	Relative of Politicians	Don't Know
Non White	-0.196***	-0.268***	0.014**	-0.087***	0.037	-0.098	0.000	0.248***	0.082	0.000
	(0.006)	(0.02)	(0.007)	(0.014)	(0.063)	(0.077)	(.)	(0.072)	(0.108)	(.)
Age	0.003***	0.001***	-0.001***	-0.001***	-0.005***	0.005***	0.000	-0.005***	-0.002	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(.)	(0.001)	(0.001)	(.)
Male	0.038***	0.035***	-0.027***	0.013**	0.036	0.031	0.000	-0.118***	-0.505***	0.000
	(0.005)	(0.008)	(0.005)	(0.006)	(0.024)	(0.032)	(.)	(0.025)	(0.04)	(.)
Ommitted Category: Protestants										
Catholic	-0.010	0.006	0.030***	0.034***	0.171***	-0.048	0.000	0.121***	0.214***	0.000
	(0.006)	(0.013)	(0.006)	(0.009)	(0.051)	(0.064)	(.)	(0.038)	(0.058)	(.)
Jewish	-0.030	0.021	-0.006	-0.010	0.153	-0.298**	0.000	0.200**	0.477***	0.000
	(0.020)	(0.028)	(0.017)	(0.015)	(0.118)	(0.13)	(.))	(0.09)	(0.076)	(.)
Other and None	-0.016	-0.013	0.011	-0.059***	-0.228***	-0.452***	0.000	-0.170***	-0.432***	0.000
	(0.010)	(0.015)	(0.010)	(0.010)	(0.045)	(0.049)	(.))	(0.046)	(0.073)	(.)
Ommitted Category: Republicans										
Democrat	0.002	-0.012	0.147***	0.107***	-0.065	0.185**	0.000	-0.012	0.693***	0.000
	(0.009)	(0.016)	(0.009)	(0.014)	(0.076)	(0.082)	(.))	(0.048)	(0.066)	(.)
Other Party	-0.040***	-0.046**	-0.002	0.010	-0.157**	-0.213***	0.000	-0.120**	0.329***	0.000
	(0.011)	(0.018)	(0.011)	(0.011)	(0.063)	(0.078)	(.))	(0.053)	(0.081)	(.)
Democrat x Republican	-0.033***	-0.024	-0.345***	-0.195***	0.085	-1.320***	0.000	-0.049	-0.831***	0.000
	(0.012)	(0.017)	(0.011)	(0.014)	(0.087)	(0.108)	(.))	(0.064)	(0.083)	(.)
Other Party x Republican	-0.012	0.013	-0.121***	-0.103***	0.023	-0.786***	0.000	0.029	-0.741***	0.000
	(0.014)	(0.021)	(0.014)	(0.013)	(0.066)	(0.094)	(.))	(0.050)	(0.076)	(.)
College	0.188***	0.205***	0.016***	0.022***	0.500***	0.231***	0.000	0.577***	0.222***	0.000
	(0.005)	(0.011)	(0.005)	(0.008)	(0.038)	(0.057)	(.))	(0.030)	(0.042)	(.)
Beta Correlation										
Trust People GSS	1.00	0.88	0.26	0.33	0.00	0.18	-0.25	0.03	0.01	-0.06
Trust People ANES		1.00	0.13	0.30	0.12	0.11	-0.31	0.23	-0.10	-0.20
Trust Gov GSS			1.00	0.69	-0.34	0.46	-0.24	-0.44	0.52	-0.07
Trust Gov ANES				1.00	-0.30	0.47	-0.30	-0.25	0.34	-0.11
Observations	34062	15440	37188	28120	51946	51946	51946	51863	51863	51863

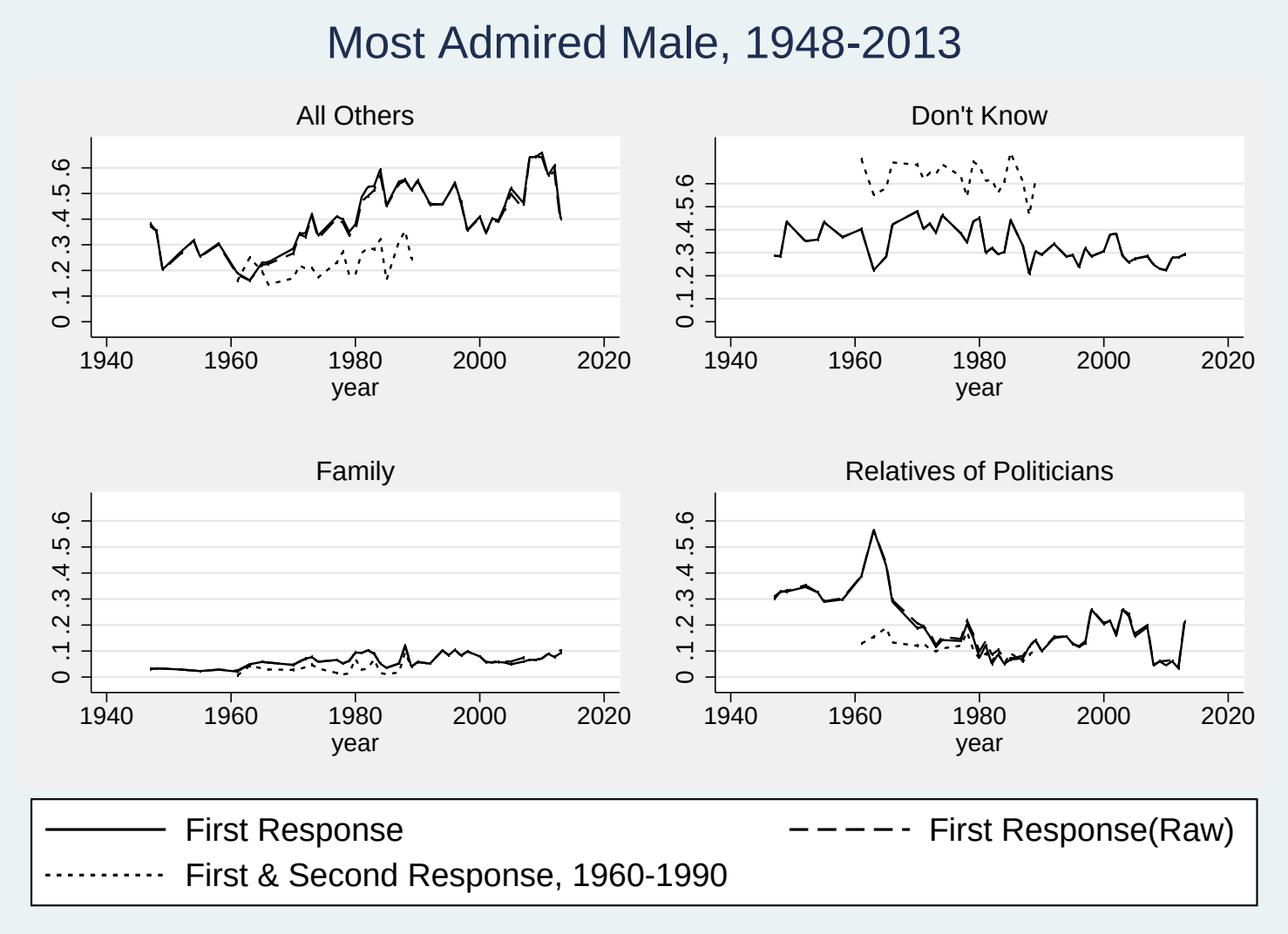
Note: This table presents regression analysis between trust and admiration for a longer time period. The data is obtained from the General Social Survey, Annual National Electoral Survey and Gallup Opinion Polls. The data spans from 1972-2012, 1964-2008 and 1948-2013 respectively. All regressions control for region and year fixed effects. Robust standard errors applied for ANES sample. Standard errors clustered at the state level for the rest of the regressions. Linear probability models estimated for columns (1) to (4), while multinomial logit specification estimated for columns (5) and (6) with referent category as Don't Know. Non White is a dummy variable for race, Age is measured in years, Male is a dummy variable for gender, Catholic, Jewish and Other and None are dummy variables for religious affiliation (relative to Protestants), Democrat and Other Party are dummy variables for respondents political preferences (relative to being Republican), Democrat/ Other Party X Republican is an interaction between respondent's political preference and if the sitting President is a Republican and college is a dummy variable for having some years of post-secondary education. The beta proportionality test reports the chi-square statistic. Trust in Federal Government in the GSS sample is a measure of confidence in the Executive branch of Federal Government. Beta correlations are correlations between the predicted values across the regressions.

Figure 3.1: Most Admired Male - All data



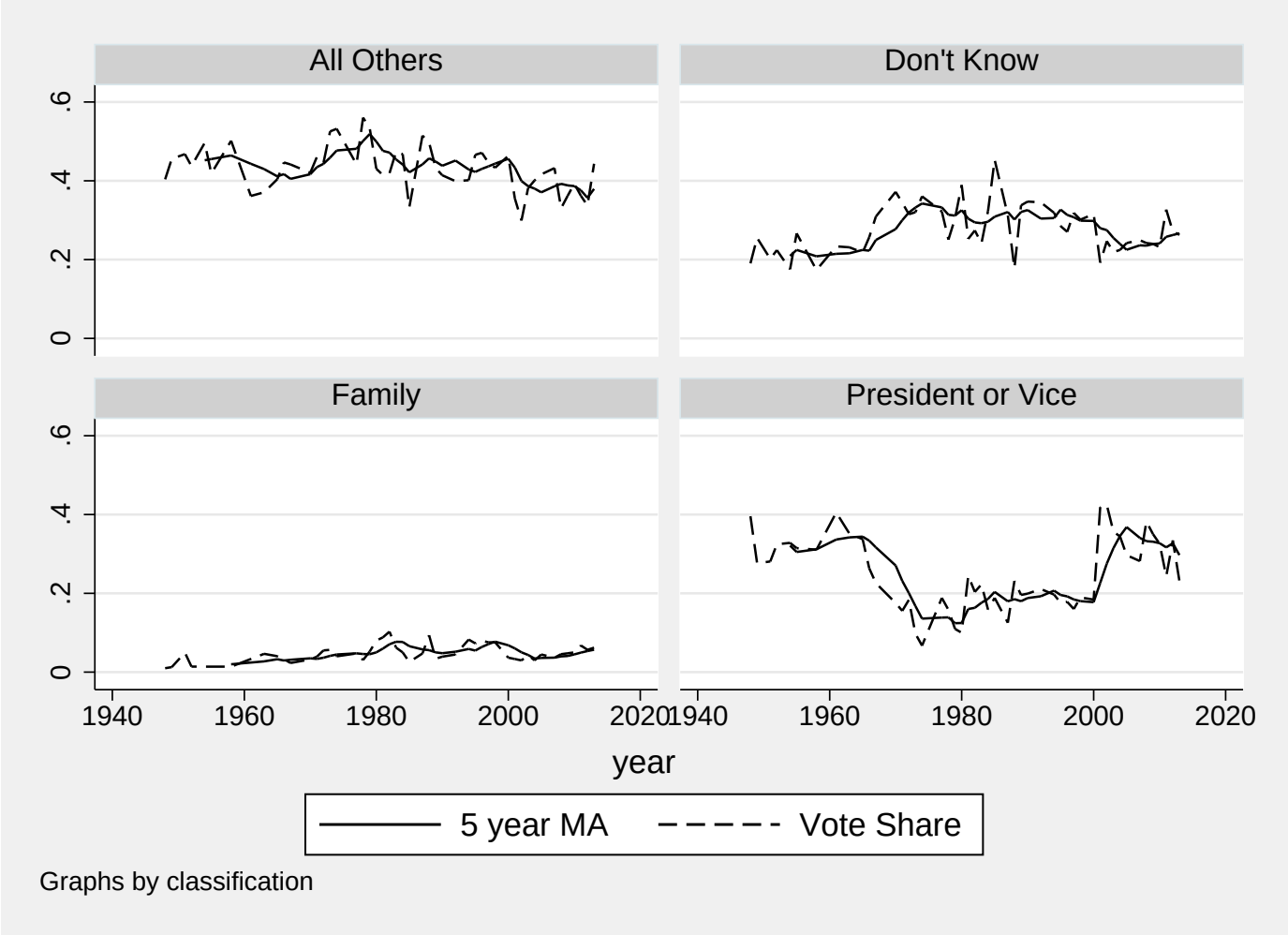
Note: This figure plots the share of votes for most admired male over time. Source: Gallup Opinion Poll.

Figure 3.2: Most Admired Female - All data



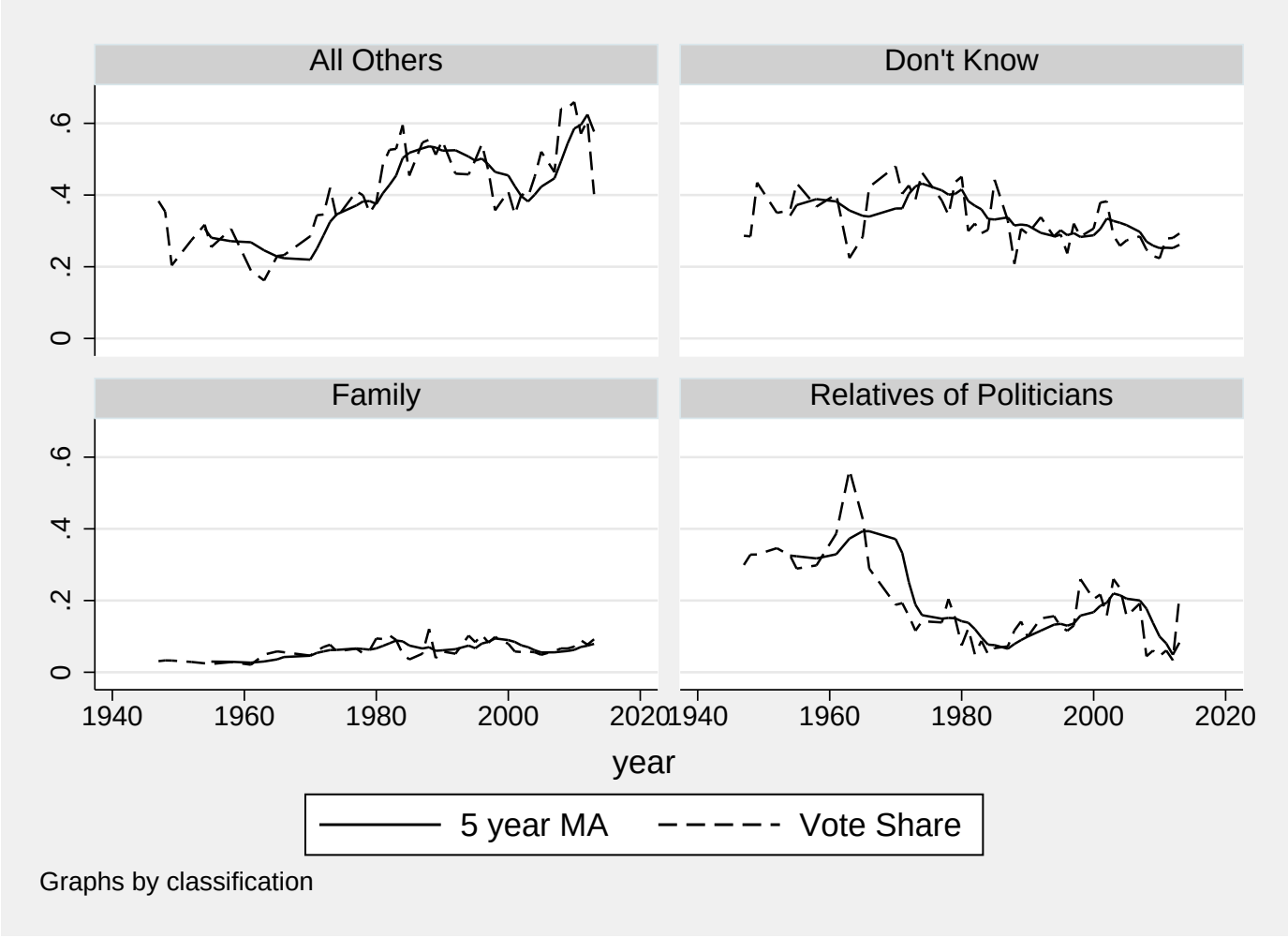
Note: This figure plots the share of votes for most admired female over time. Source: Gallup Opinion Poll.

Figure 3.3: Most Admired Male



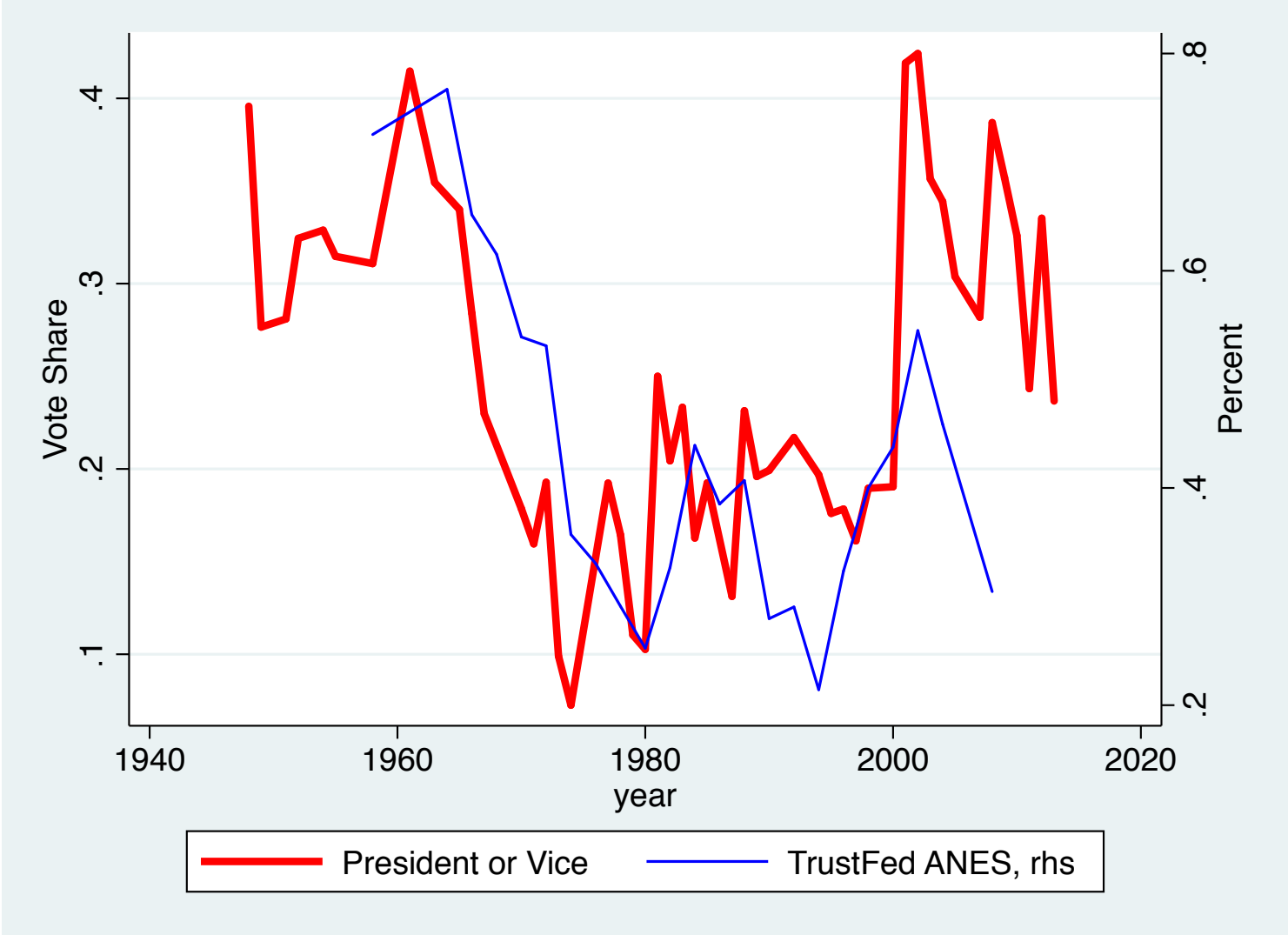
Note: This figure plots the share of votes for most admired male based on first response only. The solid line is a 5-year moving average. Source: Gallup Opinion Poll.

Figure 3.4: Most Admired Female



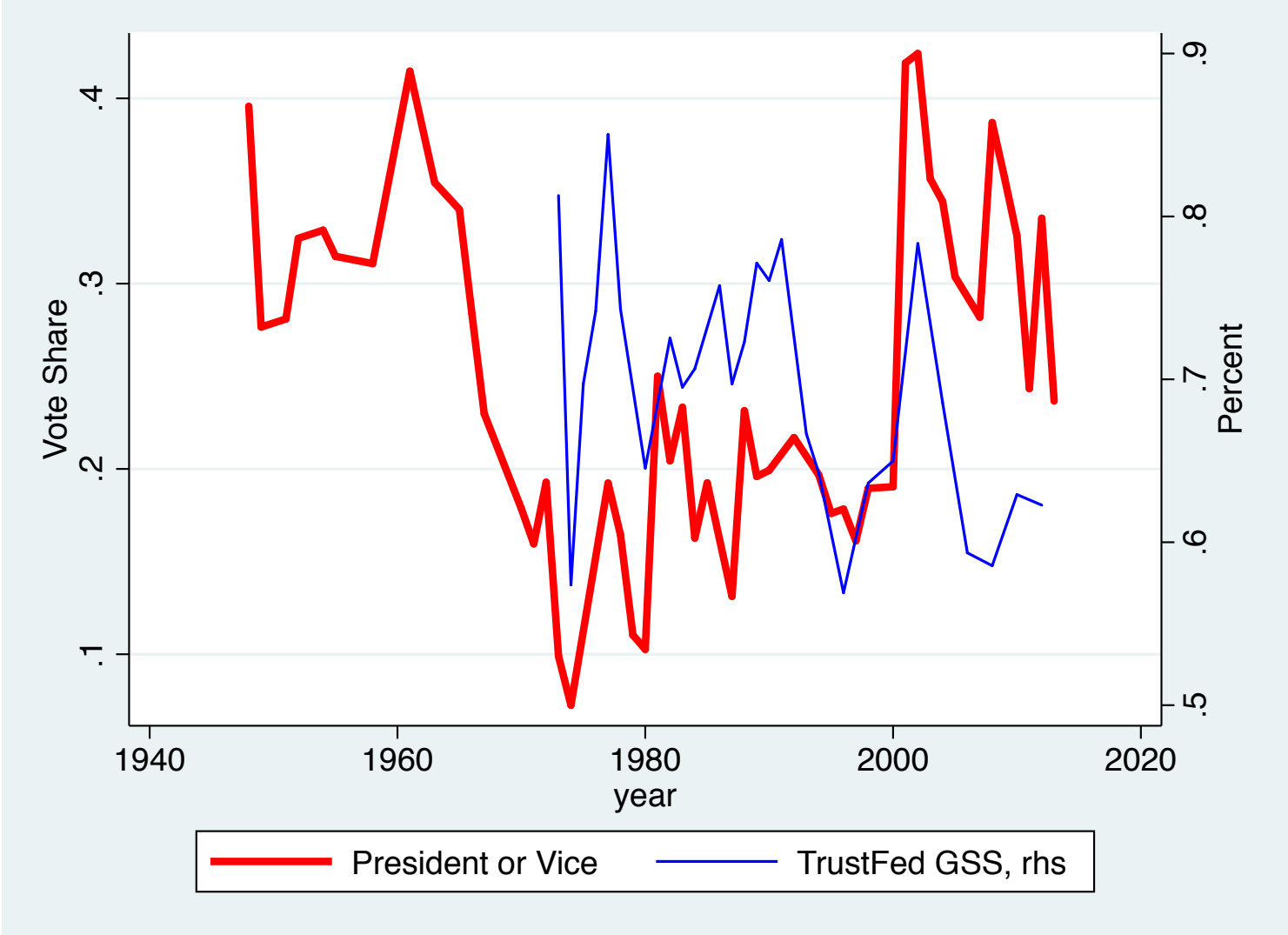
Note: This figure plots the share of votes for most admired female based on first response only. The solid line is a 5-year moving average. Source: Gallup Opinion Poll, 1948-2013.

Figure 3.5: Admiration of the President/Vice and Trust in Federal Government ANES



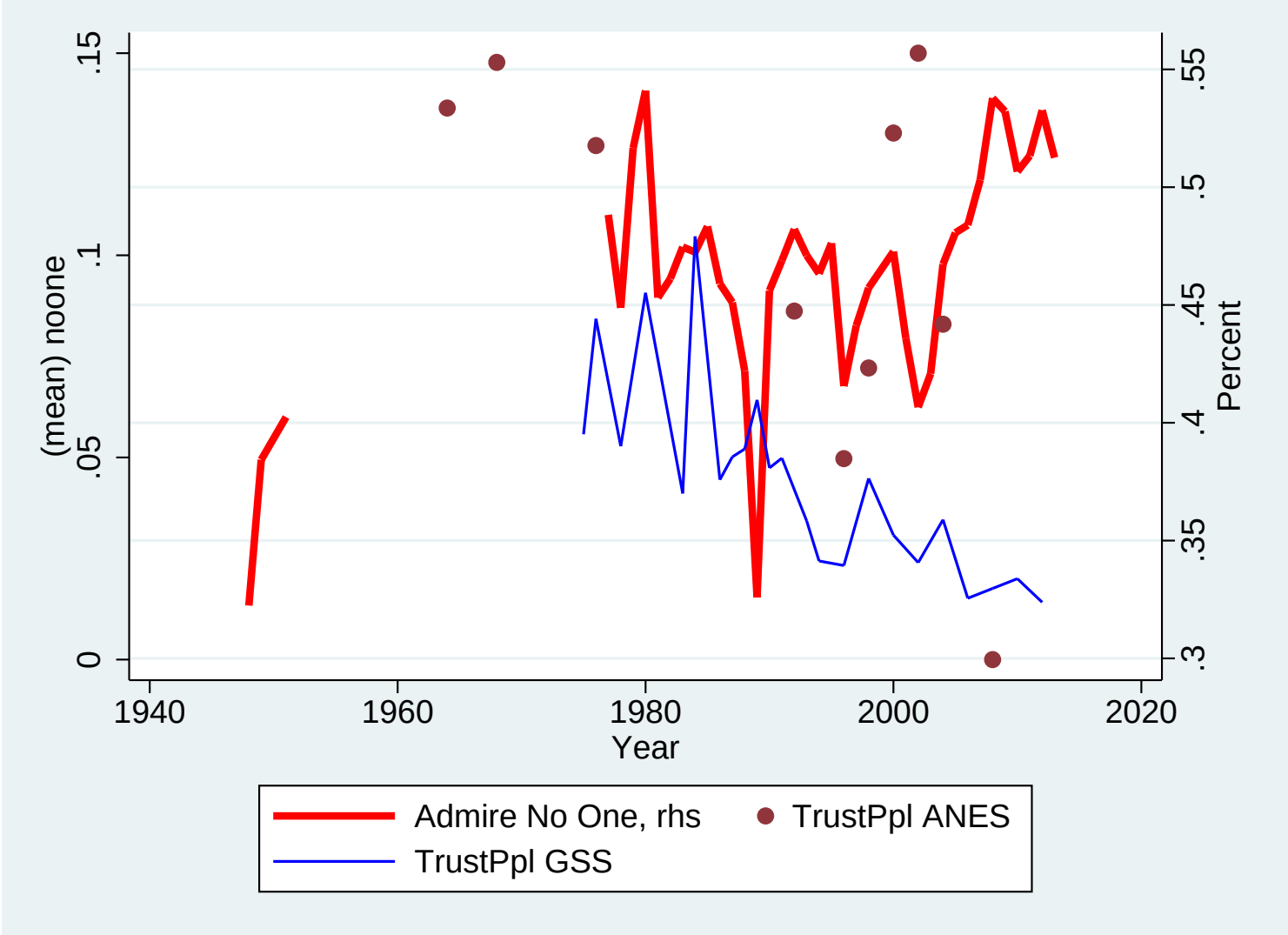
Note: This figure plots the share of votes for the president or the vice president based on first response only and the fraction of people with trust in the Government. Source: Gallup Opinion Poll and Annual National Electoral Survey.

Figure 3.6: Admiration of the President/Vice and Trust in Federal Government GSS



Note: This figure plots the share of votes for the president or the vice president based on first response only and the fraction of people with trust in the Government. Source: Gallup Opinion Poll and Generalised Social Survey.

Figure 3.7: Admiration of No-One and Trust in People



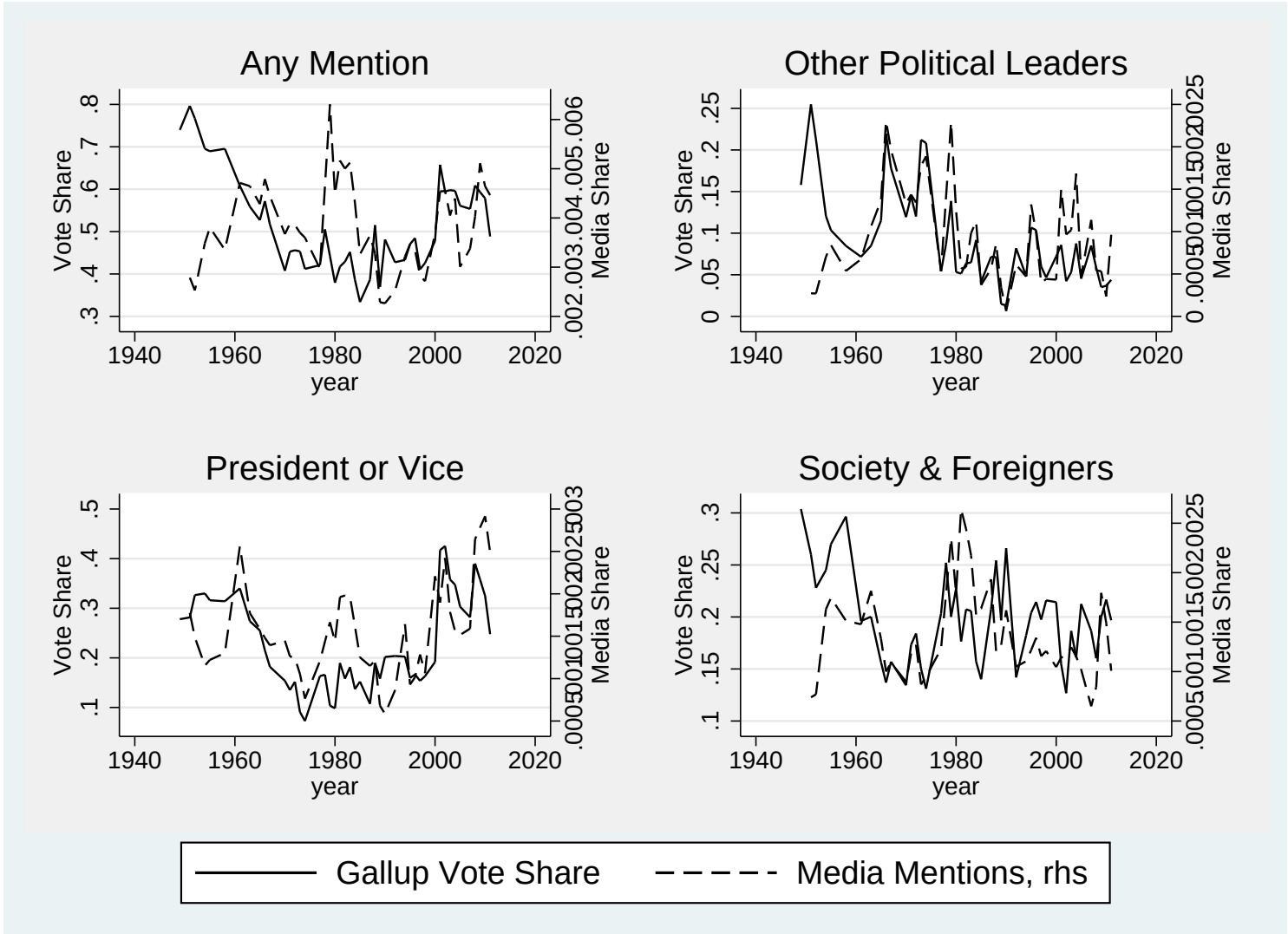
Note: This figure plots the share of votes for reporting admiring 'no-one' based on first response only and the fraction of people with trust in other people. Source: Gallup Opinion Poll, Annual National Electoral Survey and General Social Survey.

Table 3.8: Summary Statistics for Media Analysis

Variable	Mean	Std. Dev.	Min.	Max.	N
Mentions	0.75	2.809	0	86	37945
Avg. No. of Resp.	48.241	54.208	1	453	37945
News presence	0	1	-0.641	20.706	37945
Age	59.958	13.962	21	97	37945
Non White	0.152	0.359	0	1	37945

Note: This table reports summary statistics for data used in the media analysis. Mentions is the average number of times a name is mentioned across newspapers in state s and year t. Avg. No. Of Resp. is the average number of respondents during the Gallup survey in in state s and year t. News presence is constructed by scaling the mentions by the number of times the most common 4 letterwords ('that' and 'would') apper in the newspapers in state s and year t. The measure is further standard normalized for ease of interpretation. Age is measured in years and Non White is a dummy variable equal to 1 if the most admired person is not white and 0 otherwise. Source: Gallup Opinion Polls and Newspaperarchieve.com

Figure 3.8: Media and Admiration, by Gender 1949-2012



Note: This figure plots the share of votes for the most admired male based on first response only. Media share is defined as the total name count of most admired persons in the newspapers across the US, scaled by the total number of times the most common 4 letter words ('that' and 'would') appear in the newspapers. Source: Gallup Opinion Poll, Newspaperarchieve.com and authors calculations.

Table 3.9: Influence of Media on Most Admired Male - Balanced

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
News presence	0.264***	0.272***	0.263***	0.270***	0.282***	0.075***	0.026***
	(0.014)	(0.014)	(0.014)	(0.014)	(0.015)	(0.011)	(0.009)
Age		0.013***	0.010***	0.010***	0.010***	0.331**	-0.208***
		(0.001)	(0.001)	(0.001)	(0.001)	(0.159)	(0.076)
Non White		-0.200***	-0.299***	-0.300***	-0.299***	7.985	-13.487***
		(0.071)	(0.072)	(0.072)	(0.072)	(6.275)	(3.233)
Year FE	No	No	Yes	Yes	Yes	Yes	.
Region FE	No	No	No	Yes	.	.	.
State FE	No	No	No	No	Yes	Yes	Yes
Name FE	No	No	No	No	No	Yes	.
Name Year FE	No	No	No	No	No	No	Yes
Mean of dependent variable	.75	.75	.75	.75	.75	.75	.75
Observations	37945	37945	37945	37945	37945	37945	37945

Note: This table reports the relationship between newspaper presence and share of votes the most admired person gets. The dependent variable is the frequency of votes the most admired person got in state s and year t. News presence is the frequency of mentions the most admired person got in state s in year t, normalized by the average times 'that' and 'would' appear in the newspapers in state s and year t. All regressions have been offset by the total number of respondents in state s in year t to account for differential sampling. Robust standard errors are in parenthesis clustered by state.

3.A Appendix

Table 3.A.1: Gallup Questionnaire Summary

Survey Details											Response Groupings										
year	**Q**	**All**	**M**	**2nd Resp M**	**F**	**2nd Resp F**	**No of coded M**	**No of coded F**	**Un M**	**Un F**	**Misc, Other**	**Dec**	**DK**	**NO**	**DK, NA**	**NA/ Blank**	**DK, NA, None**	**Dec, DK, NA, Blank**	**Dec, DK, NA, None**	**ND/ No 2nd Mention**	**Ref**	**Un**
1946	1	X					425		45					X	X							
1947	1	X							27					X	X							
1947	2				X			203						X	X					X		
1948	2		X		X		14	19	4	1				X	X							
1949	2		X		X		18	18	1			X		X	X							X
1950																						
1951	2		X				31		2		X			X	X							
1952	2		X		X		144	95	2		X			X	X							X
1953																						
1954	2		X		X		20	11	13		X				X							
1955	2		X		X		37	19	2		X						X					
1956																						
1957																						
1958	2		X		X		43	32			X		X	X		X						
1959																						
1960	2		X	X	X	X	26	14					X	X		X						
1961	2		X	X	X	X	95	66	3		X		X			X						
1962																						
1963	2		X	X	X	X	63	30	1		X							X				
1964																						

Continued on next page

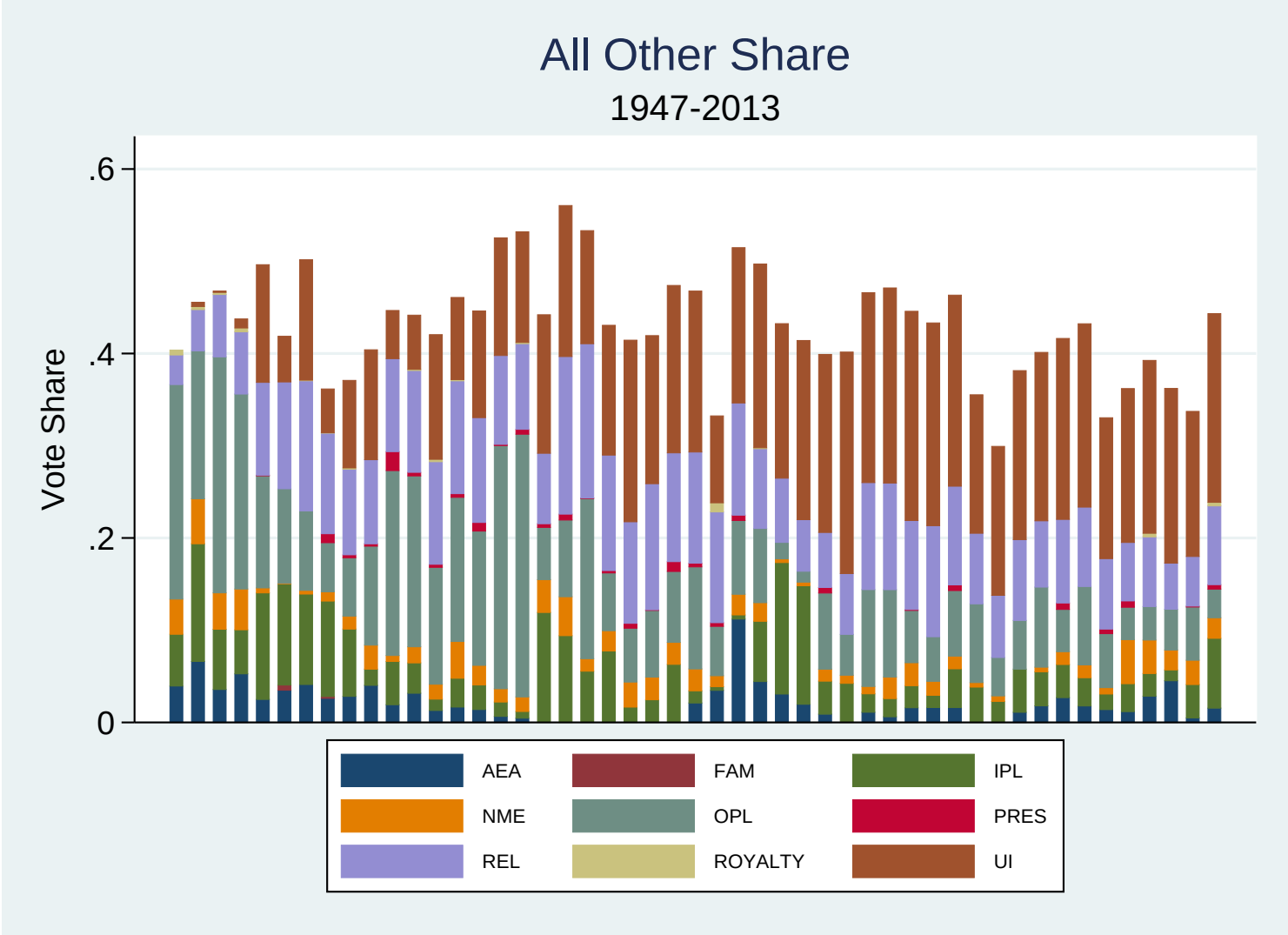
1965	2		X	X	X	X	67	58			X							X				
1966	2		X	X	X	X	73	61			X							X		X		
1967	2		X	X	X	X	83	25			X							X		X		
1968																						
1969	3				X	X		20			X				X							
1970	2		X	X	X	X	70	40			X							X		X		
1971	2		X	X	X	X	81	55			X							X		X		
1972	2		X	X	X	X	83	55			X							X				
1973	2		X	X	X	X	87	60			X							X				
1974	2		X	X	X	X	76	58			X							X				
1975	2		X	X	X	X	86	61	1		X								X			
1976	4				X																	
1977	2		X	X	X	X	24	22			X		X	X								
1978	2		X	X	X	X	26	25			X		X	X								
1979	2		X	X	X	X	27	25			X		X	X								
1980	2		X	X	X	X	29	27			X		X	X								
1981	2		X	X	X	X	28	31			X		X	X								
1982	2		X	X	X	X	34	34			X		X	X								
1983	2		X	X	X	X	34	34			X		X	X								
1984	2		X	X	X	X	41	39			X		X	X								
1985	2		X	X	X	X	46	41			X		X	X								
1986																						
1987	2		X	X	X	X	33	43	1		X		X	X								
1988	2		X	X	X	X	32	33			X		X	X								
1989	2		X	X	X	X	14	18			X		X	X								
1990	2		X	X	X	X	13	19			X		X	X								
1991																						
1992	2		X	X	X	X	21	21			X		X	X							X	
1993	2		X	X	X	X	23	23			X		X	X							X	

Continued on next page

1994	2		X	X	X	X	16	19	4		X		X	X						X	
1995	2		X	X	X	X	18	19	1		X		X	X						X	
1996	2		X	X	X	X	20	18			X		X	X						X	
1997	2		X	X	X	X	19	21			X		X	X						X	
1998	2		X	X	X	X	19	19			X		X	X						X	
1999	5	X																			
2000	2		X	X	X	X	20	15			X		X	X						X	
2001	2		X	X	X	X	18	15			X		X	X						X	
2002	2		X	X	X	X	20	19			X		X	X						X	
2003	2		X	X	X	X	19	15			X		X	X						X	
2004	2		X	X	X	X	22	19			X		X	X					X	X	
2005	2		X	X	X	X	22	22			X		X	X						X	
2006																					
2007	2		X	X	X	X	27	17			X		X	X					X	X	
2008	2		X	X	X	X	25	19			X		X	X					X	X	
2009	2		X	X	X	X	29	20			X		X	X					X	X	
2010	2		X	X	X	X	31	24			X		X	X					X	X	
2011	2		X	X	X	X	35	25			X		X	X					X	X	

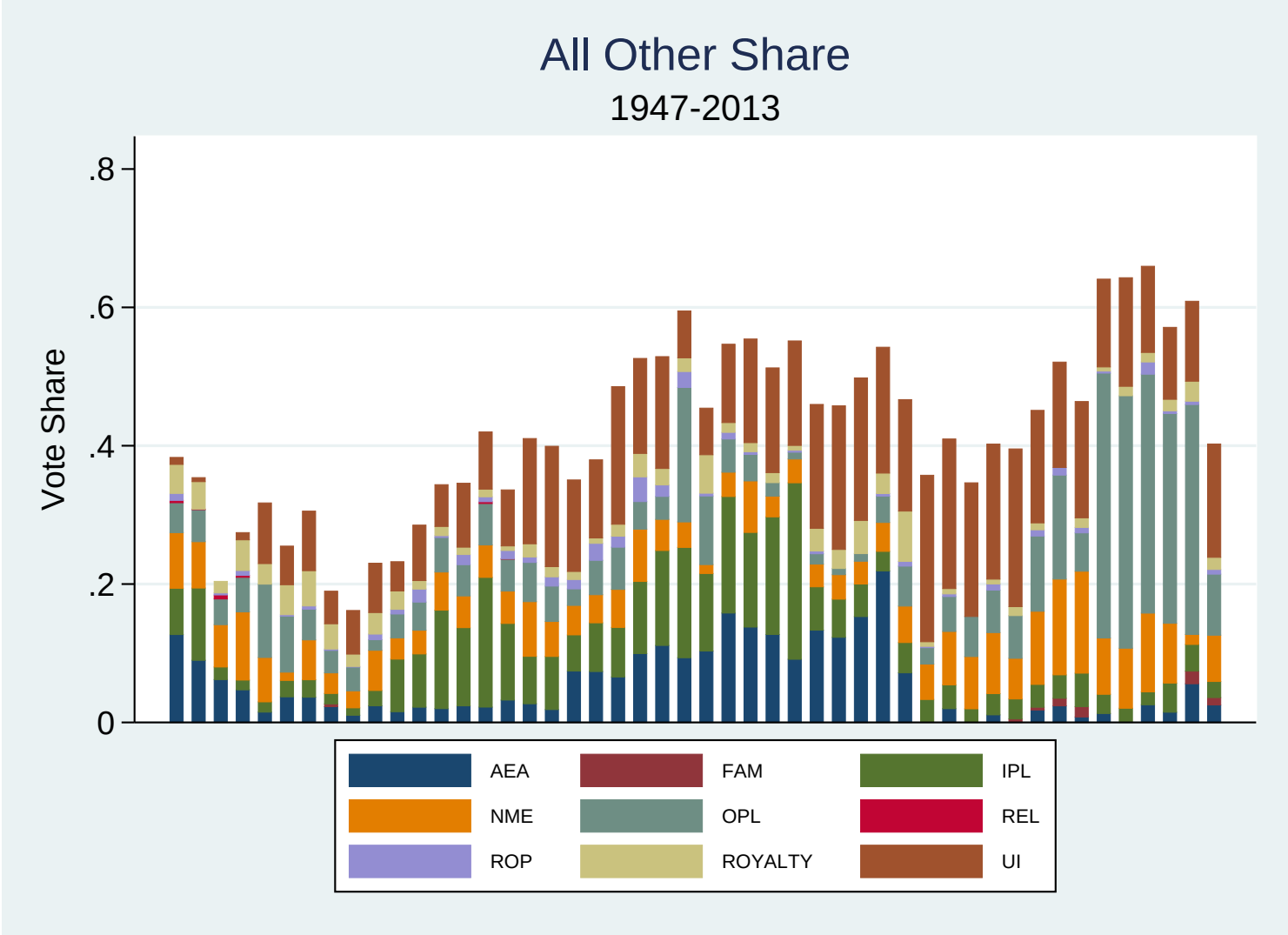
Note: This table provides a summary of the surveys questionnaires carried out by Gallup since 1947. Response grouping identifies the categories that have been used to code the survey in different years. Survey statistics provide some general descriptives regarding the most admired male question. Column Q identifies the type of question asked in each survey year. 1.What person living today in any part of the world that you have heard or read about do you admire the most? 2. What man/ woman living today in any part of the world, that you have heard or read about, do you admire the most? 3. Here is a list of 20 women. Which one of them would you say you admire the most? 4. Here is a list of prominent women. Would you tell me which three of these women you admire the most? 5. Now I'm going to read you a list of people who have lived this century. For each one, please tell me if you consider that person to one of the people you admire MOST from this century, a person you admire, but not the MOST, a person you somewhat admire, or someone you do not admire at all. First, ... How about ... M stands for males, F stands for femailes, Un stands for Unidentified, Dec stands for decesed, DK stands for don't know, NO stands for no-one, NA stands for no answer, ND stands for no data and Ref stands for refused to answer.

Figure 3.A.1: All Other Males



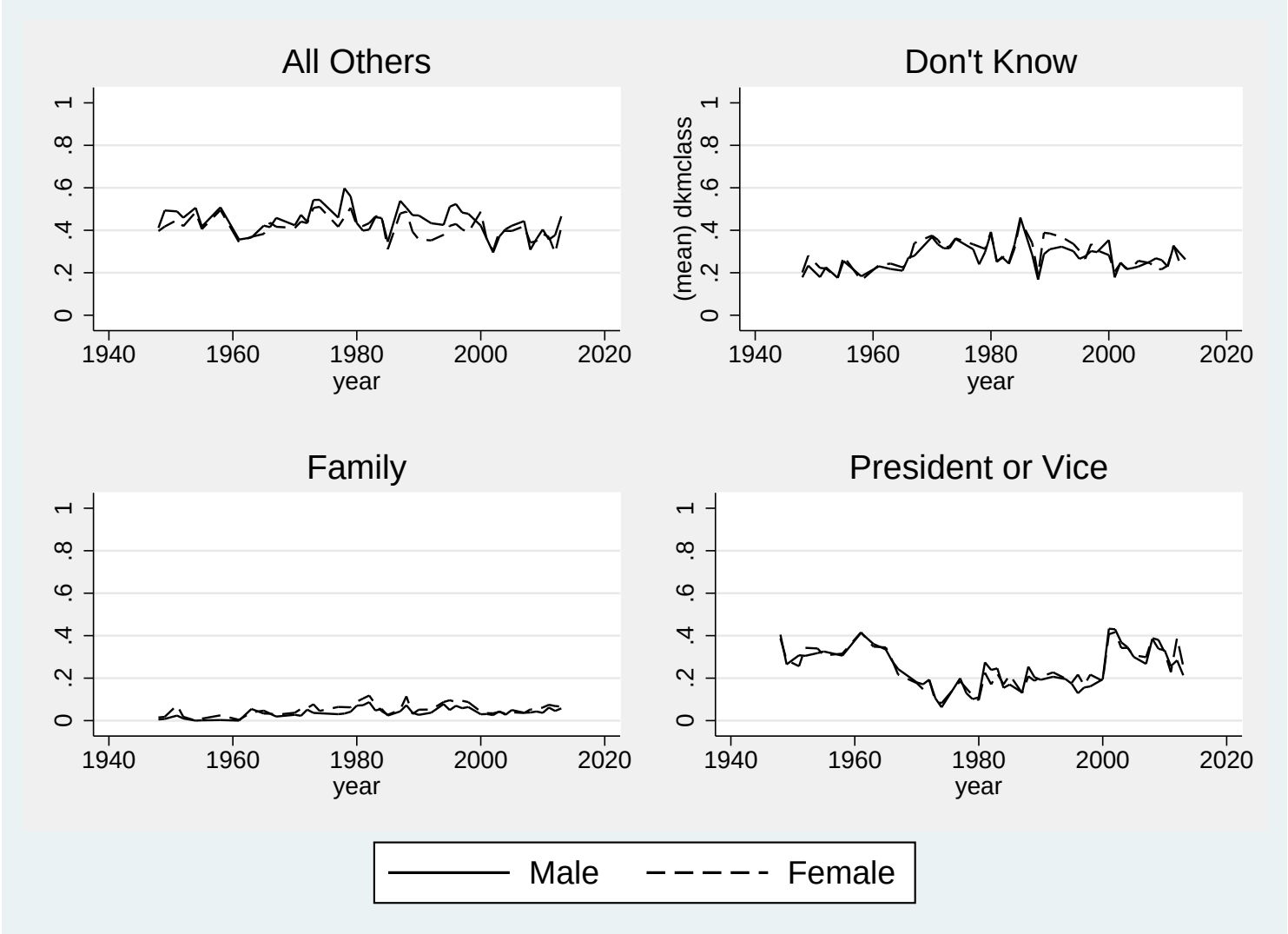
Note: This figure plots the distribution of share of votes for the all other category based on first responses adjusted data (i.e persons with rank greater than 13 are grouped under all others). Source: Gallup Opinion Poll.

Figure 3.A.2: All Other Females



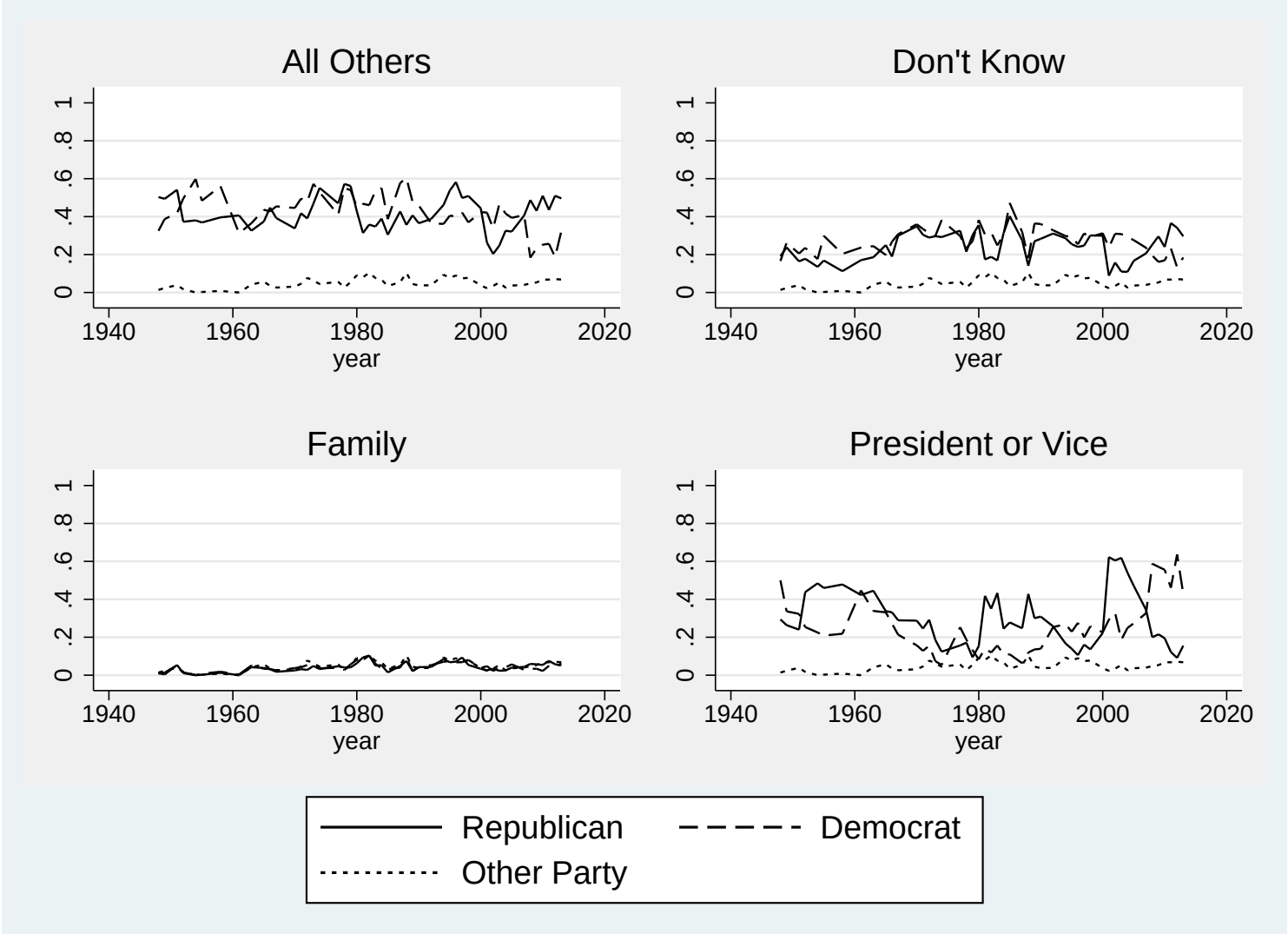
Note: This figure plots the distribution of share of votes for the all other category based on first responses adjusted data (i.e persons with rank greater than 11 are grouped under all others). Source: Gallup Opinion Poll.

Figure 3.A.3: Most Admired Male, by Gender



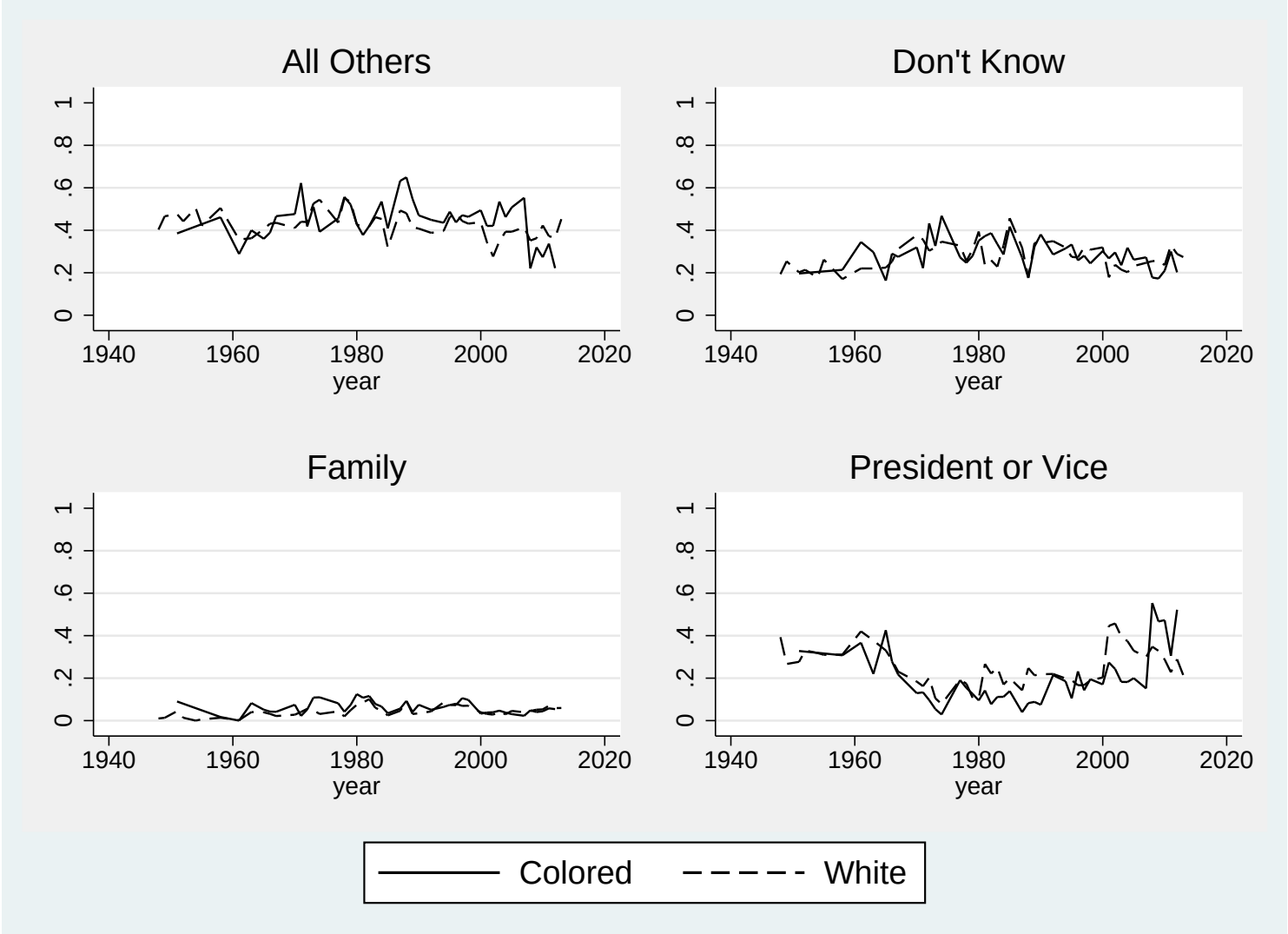
Note: This figure plots the share of votes for most admired male over time by respondent characteristics. Source: Gallup Opinion Poll.

Figure 3.A.4: Most Admired Male, by Political Affiliation



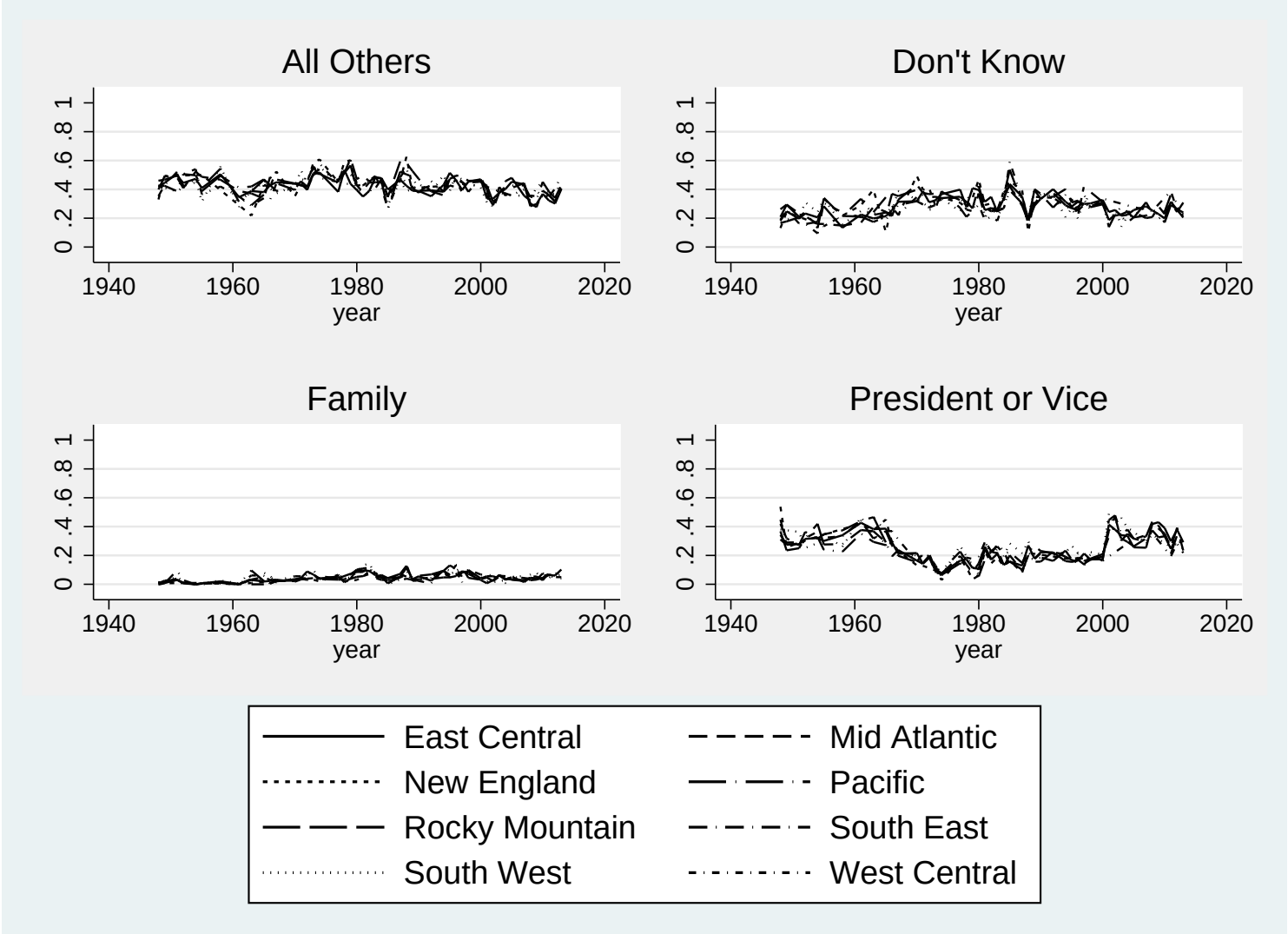
Note: This figure plots the share of votes for most admired male over time by respondent characteristics. Source: Gallup Opinion Poll.

Figure 3.A.5: Most Admired Male, by Race



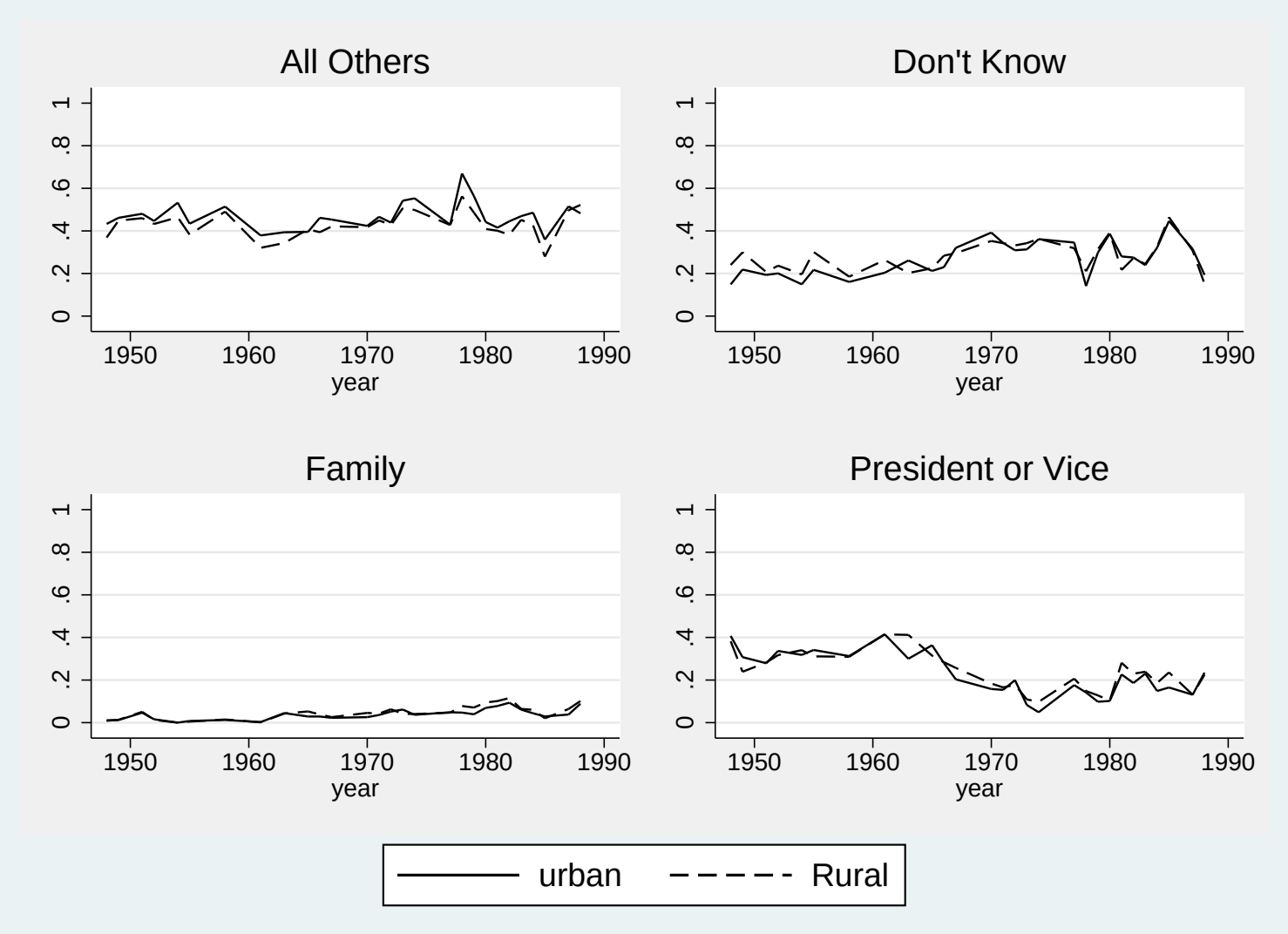
Note: This figure plots the share of votes for most admired male over time by respondent characteristics. Source: Gallup Opinion Poll.

Figure 3.A.6: Most Admired Male, by Region of Residence



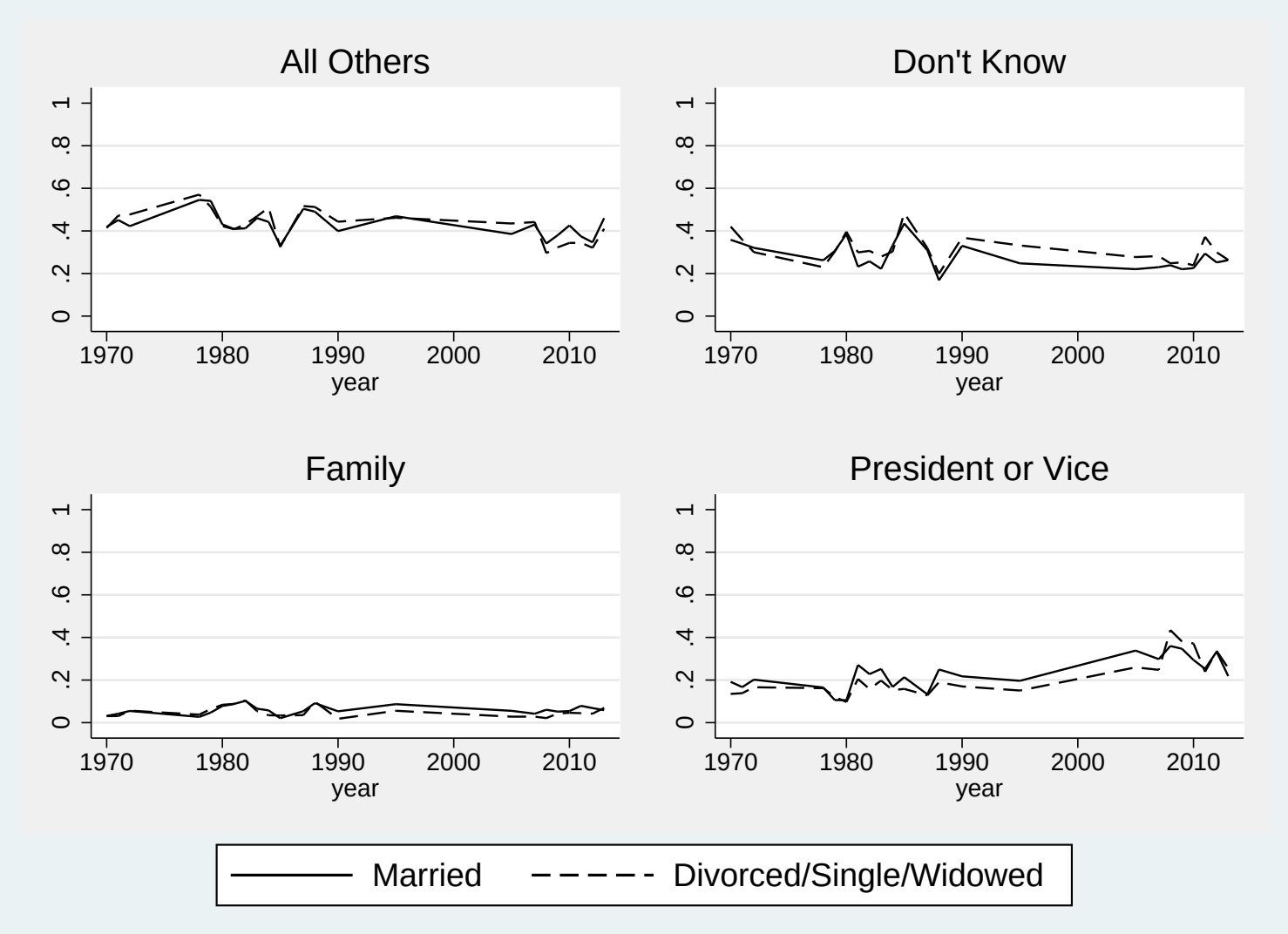
Note: This figure plots the share of votes for most admired male over time by respondent characteristics. Source: Gallup Opinion Poll.

Figure 3.A.7: Most Admired Male, by Urban Status



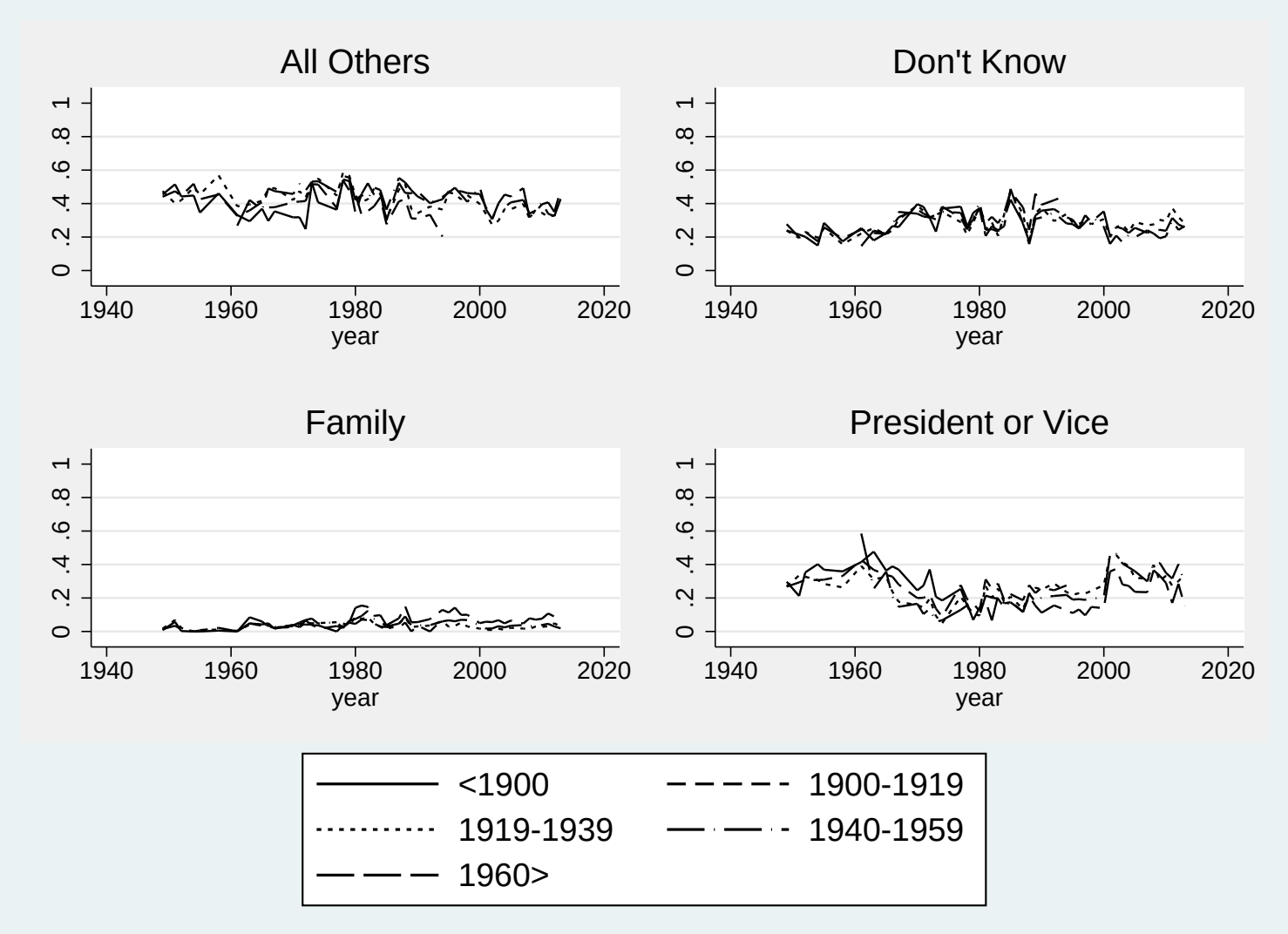
Note: This figure plots the share of votes for most admired male over time by respondent characteristics. Source: Gallup Opinion Poll

Figure 3.A.8: Most Admired Male, by Marriage Status



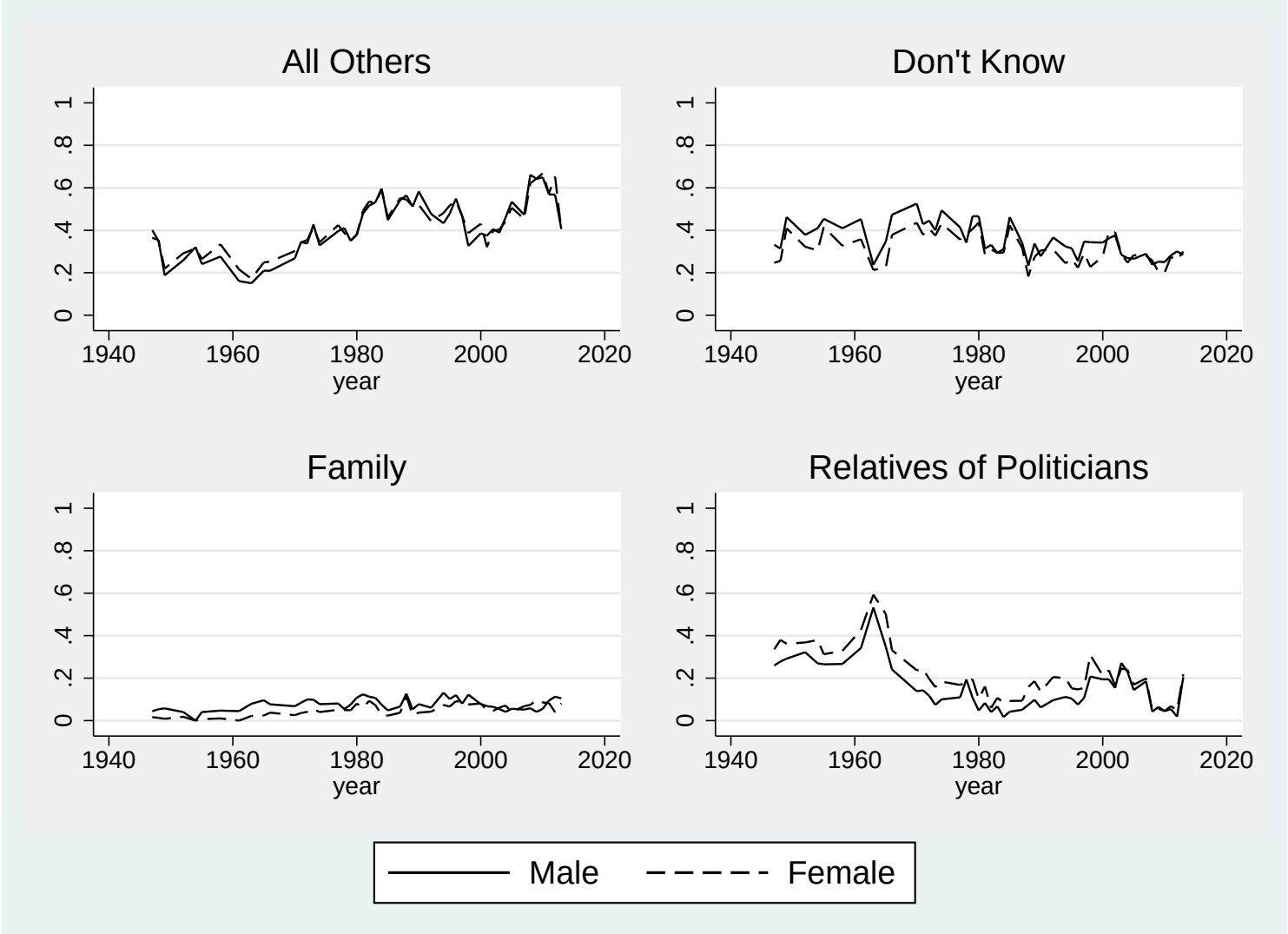
Note: This figure plots the share of votes for most admired male over time by respondent characteristics. Source: Gallup Opinion Poll.

Figure 3.A.9: Most Admired Male, by Birth Cohort



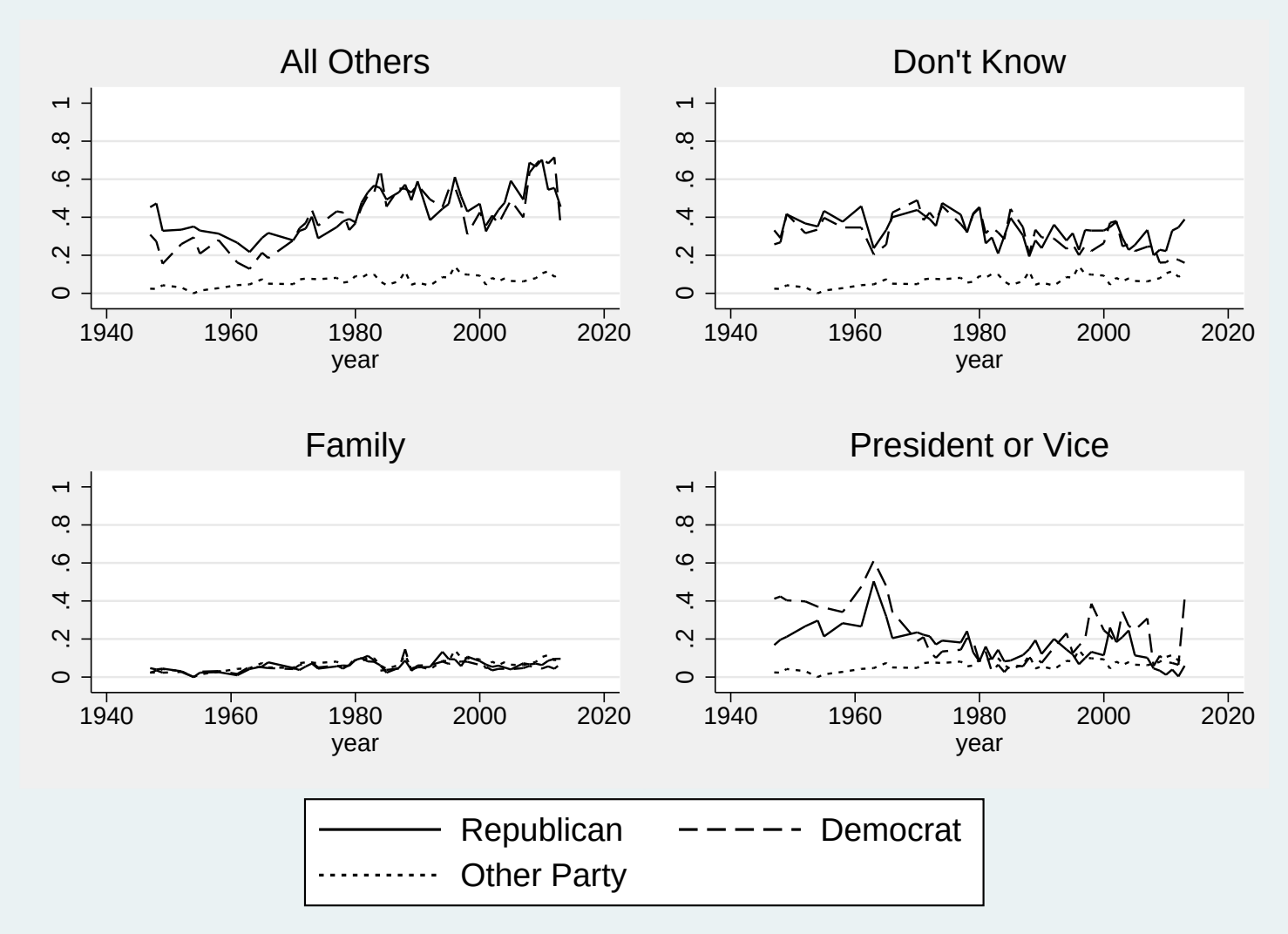
Note: This figure plots the share of votes for most admired male over time by respondent characteristics. Source: Gallup Opinion Poll.

Figure 3.A.10: Most Admired Female, by Gender



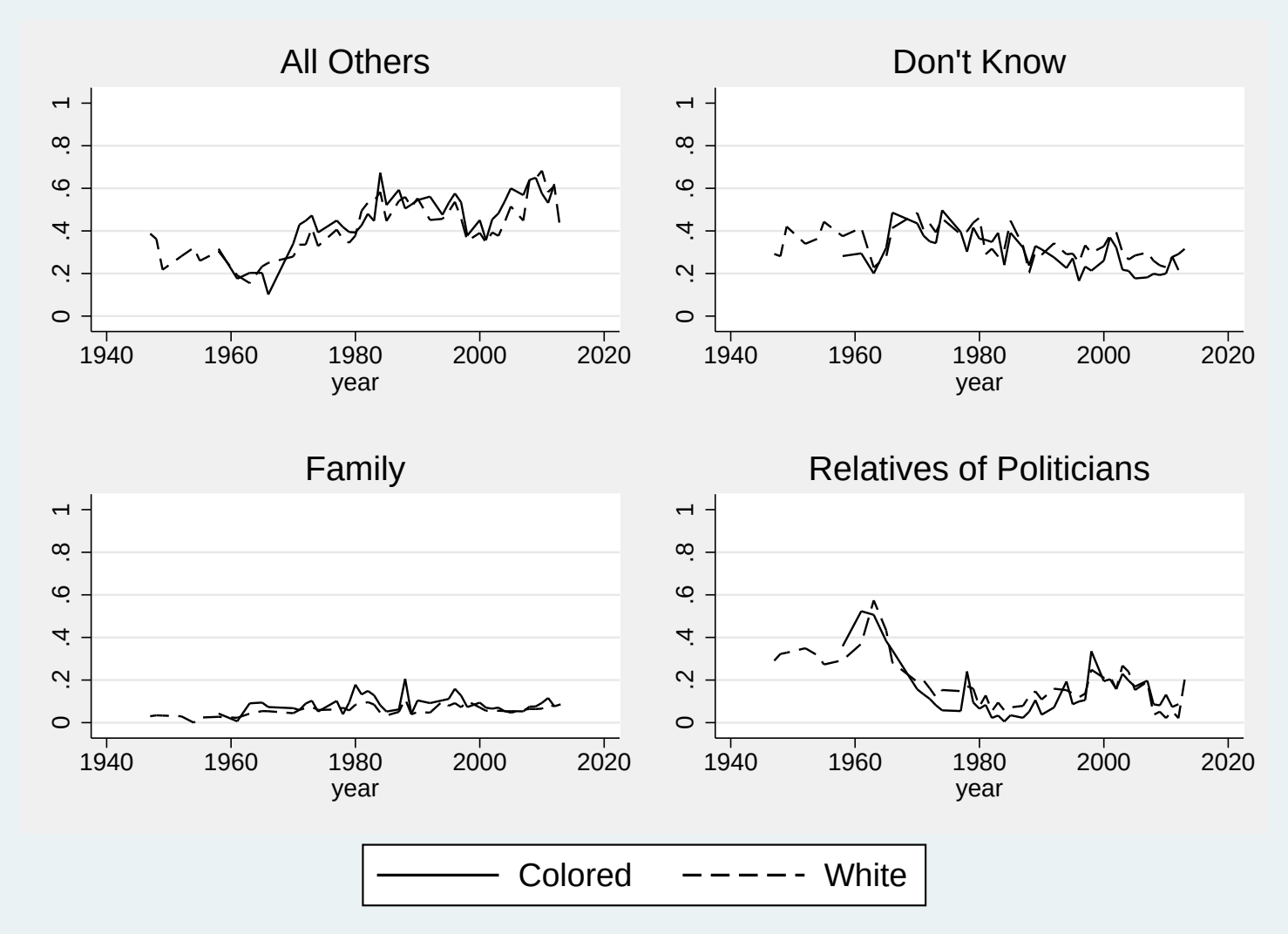
Note: This figure plots the share of votes for most admired female over time by respondent characteristics. Source: Gallup Opinion Poll.

Figure 3.A.11: Most Admired Female, by Political Affiliation



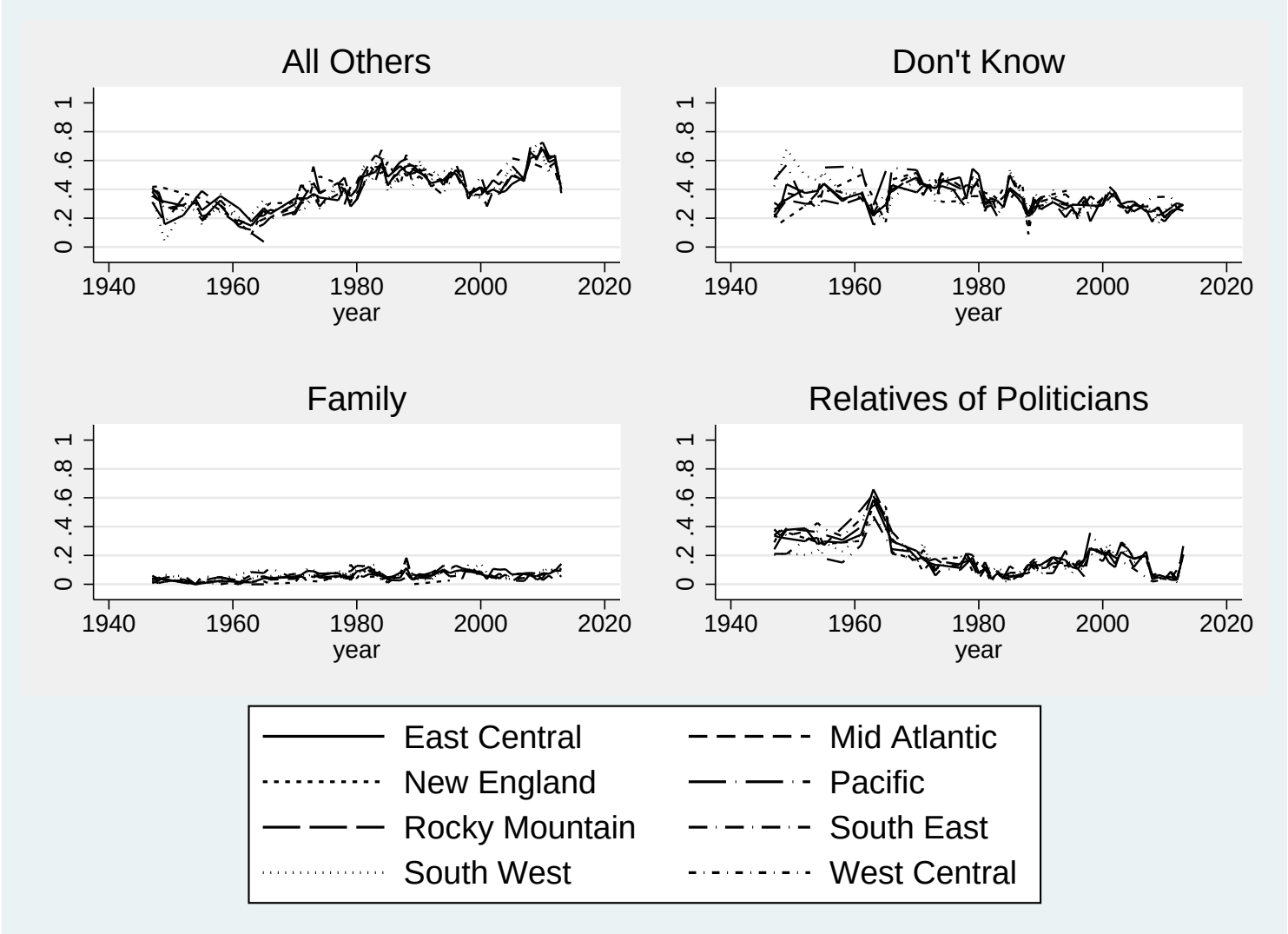
Note: This figure plots the share of votes for most admired female over time by respondent characteristics. Source: Gallup Opinion Poll.

Figure 3.A.12: Most Admired Female, by Race



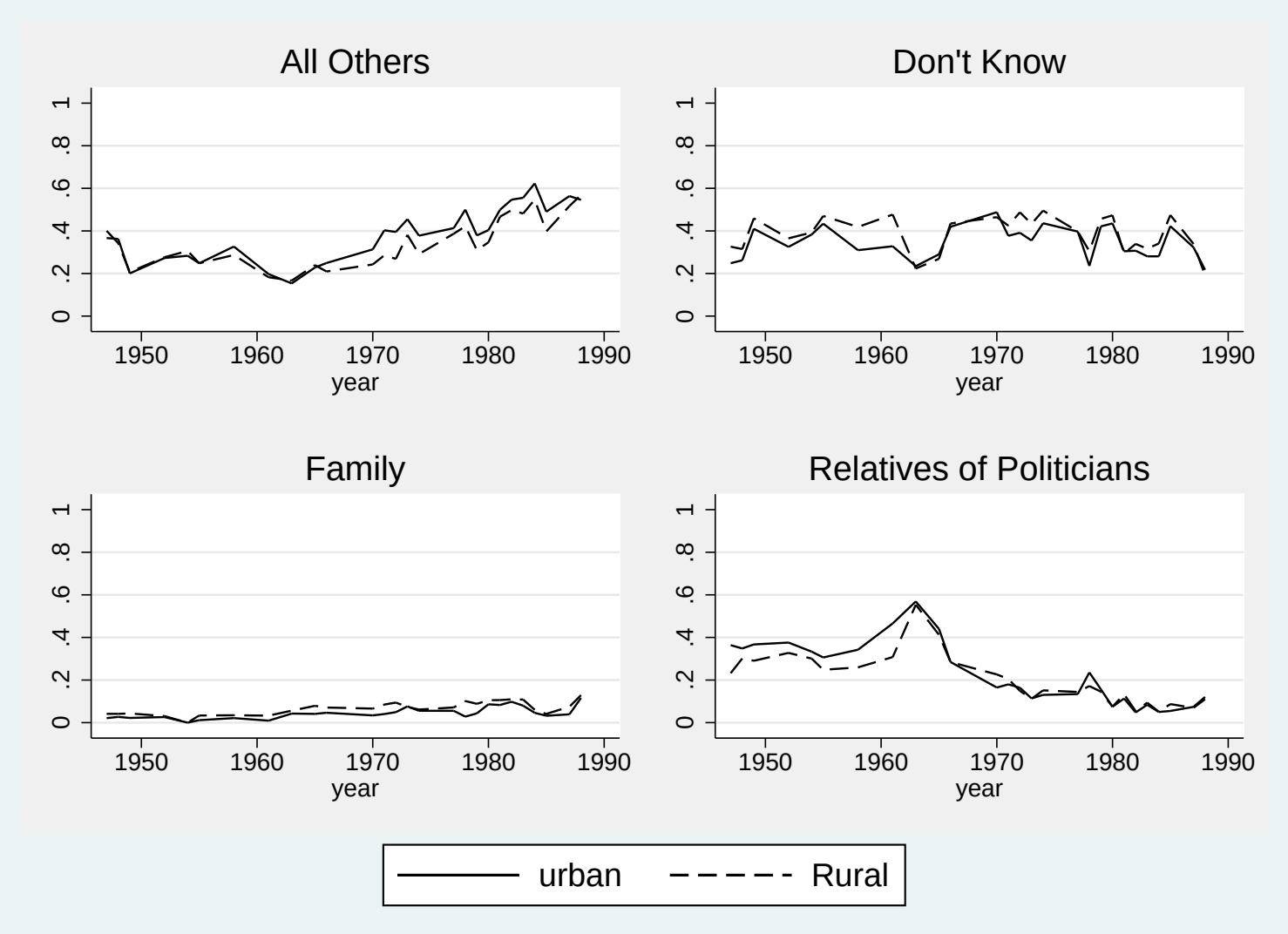
Note: This figure plots the share of votes for most admired female over time by respondent characteristics. Source: Gallup Opinion Poll.

Figure 3.A.13: Most Admired Female, by Region of Residence



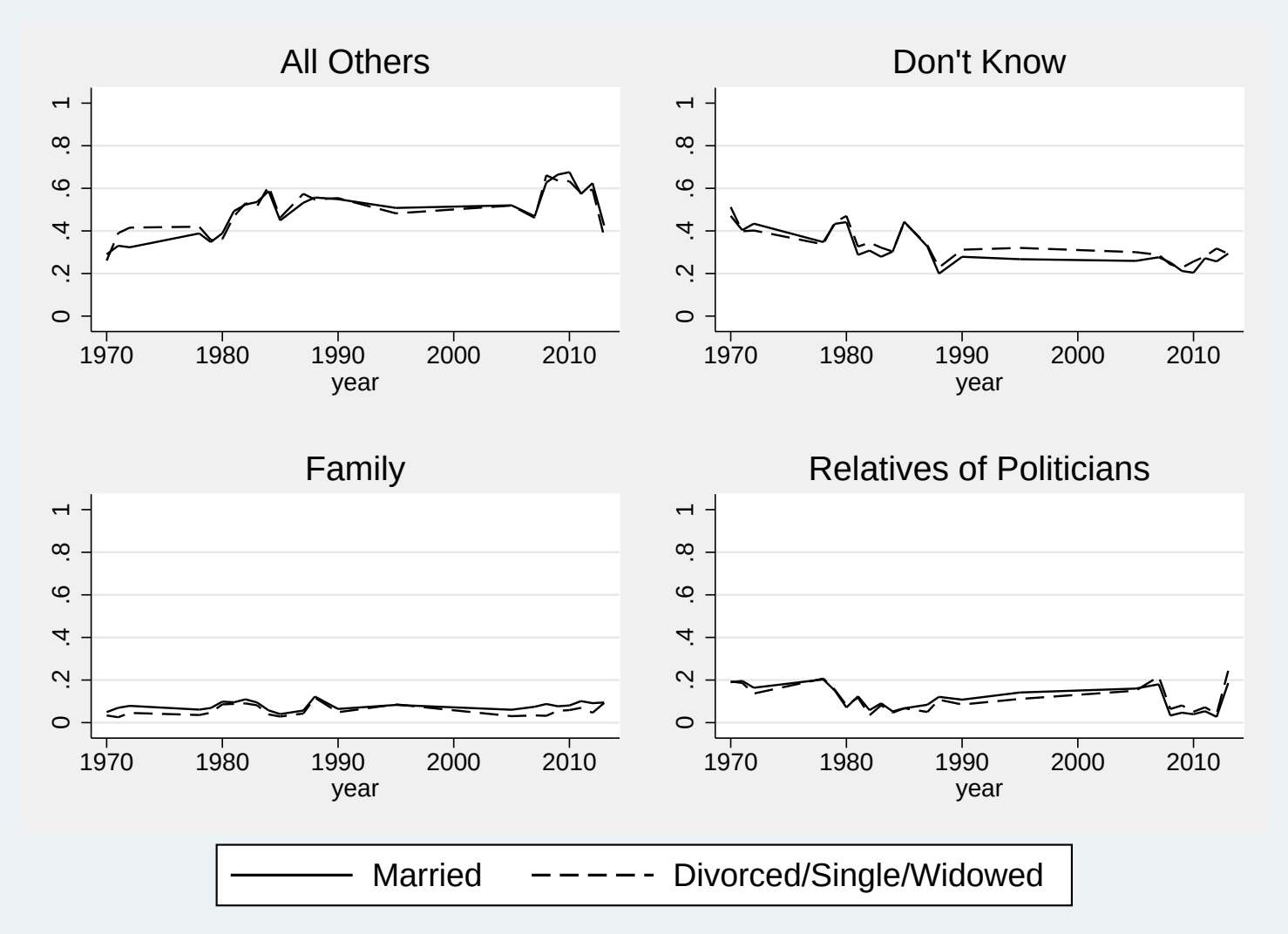
Note: This figure plots the share of votes for most admired female over time by respondent characteristics. Source: Gallup Opinion Poll.

Figure 3.A.14: Most Admired Female, by Urban Status



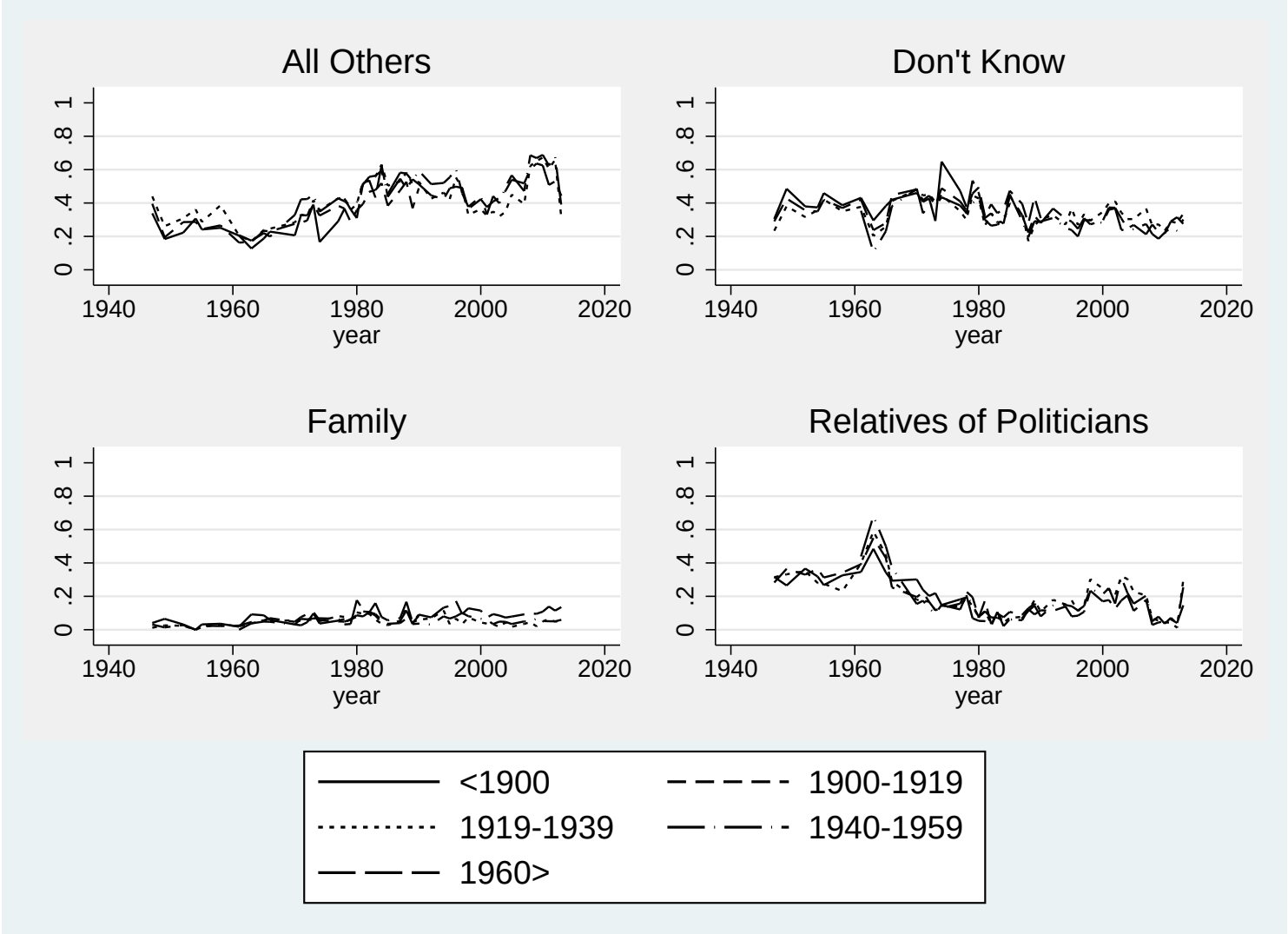
Note: This figure plots the share of votes for most admired female over time by respondent characteristics. Source: Gallup Opinion Poll.

Figure 3.A.15: Most Admired Female, by Marriage Status



Note: This figure plots the share of votes for most admired female over time by respondent characteristics. Source: Gallup Opinion Poll.

Figure 3.A.16: Most Admired Female, by Birth Cohort



Note: This figure plots the share of votes for most admired female over time by respondent characteristics. Source: Gallup Opinion Poll.

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